

Apple Orchard™

JANUARY 1984
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The Premier Magazine for Apple Computer Users

//e Sixteen-color Hi-Res:
You Can Do It!

ProDOS

CP/M for You?

**Buying
Software**

WPL

Motherhood

THE SECRETS OF PERFECT MEMORY: ONE AND ONE HALF EARTH DOLLARS

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all!

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so it never loses its
memory.

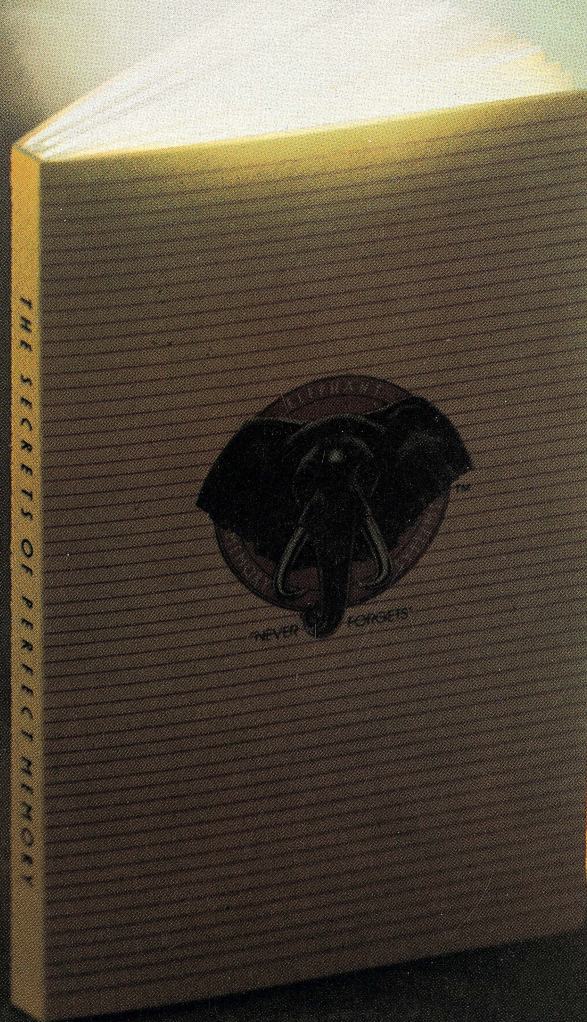
How fingerprints can
actually damage disks.
Unretouched Kirlian
photographs of UFO's
(Unidentified Floppy
Objects)! The incredible
importance of making
copies: the Department
of Redundancy Depart-
ment— and what goes on
when it goes on! Power-
ful secret methods that
scientists claim can ac-
tually prevent computer
amnesia! All this, and
much more . . .

In short, it's an 80-
page plain-English,
graphically stunning,
pocket-sized definitive
guide to the care and
feeding of flexible disks.

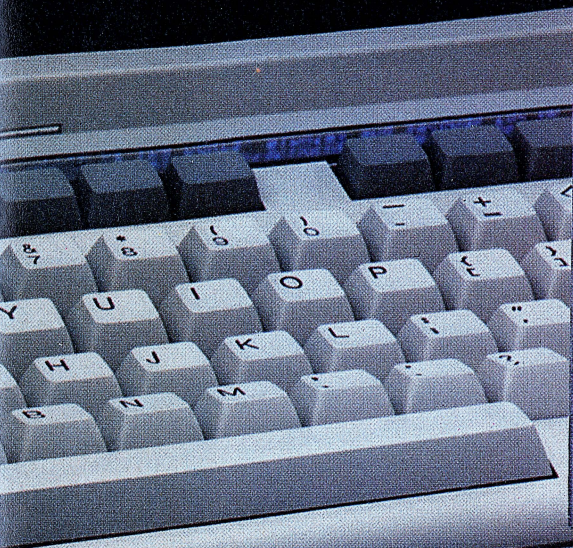
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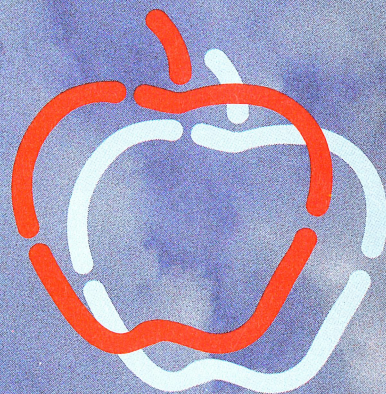
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APPLEO

Volume 5 Number 1 / January 1984
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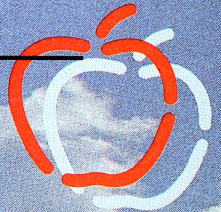
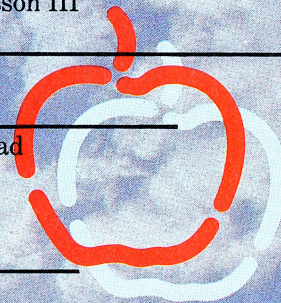
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Coming Next Month . . .

*The Real news for 1984!
'nuff said.*

Apple Orchard

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January 1984

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Textfile

Our normal schedule of articles has been knocked awry by one of the more interesting projects to come our way in a long time: True 16-color Hi-Res graphics on the Apple //e, from the disk of Allen Watson III. We reshuffled that schedule to bring this one to you as quickly as possible. If you type in the code (or get the demo disk), it’s something you can do yourself. And, Apple Computer is providing these routines to software developers; 16-color Hi-Res has only begun to impact the //e world.

So what else has Allen Watson written? Well, how about the Apple //e Reference Manual? Literally, he “wrote the book”, and other manuals as well; we’re honored to have him with us. Allen started programming after receiving his bachelor’s degree in mathematics, and has worked with computers of all sizes. He bought Apple II serial number 248 in 1977, and has been with Apple since 1980.

Elsewhere in this issue, Pat Caffrey introduces us to ProDOS, the new operating system for Apple IIs. Neil Lipson (with help) covers Software Automatic Mouth; Richard Loggins continues his WPL series; Woody Liswood covers EPS and the EZcard; And we take a look at CP/M (with Gene Wilson to follow up).

Apple Orchard is unique in that it’s written and edited *by* Apple users *for* Apple users, and not by recent and recycled journalism majors. Only a small fraction of our authors are professional writers; but virtually all of our writers are Apple users, sharing their experiences with you.

Our masthead shows some changes this month. Gene Wilson and Lenore Wolgelenter join us as Senior Editors (Lenore doesn’t look it), and Joanne Short as Business Manager. Lenore will also be handling some much-needed marketing chores for the magazine. As part of a reorganization around here, Ellen Roznar (Accounting) and Eva Baragona (Customer Service) join our staff full-time. It all means a better **Apple Orchard**.

As we go to press, we learn that Apple is considering (and may have announced by the time you read this) dropping its AppleNet local area network. Instead, Apple will support and connect to the IBM local area network, when released. Further, buried in a news release was the comment that Apple would no longer insist on making its own disk drives. That could mean anything, but don’t be surprised to see the Sony 3½-inch drives turning up inside beige boxes.

Those of you who read our February 1983 issue remember Pat Caffrey’s detailed article on the Apple //e. That issue appeared on the same day the //e was introduced, which meant that it was a few days late, but *very* timely. Well, Pat is still with us, Gene Wilson has joined us, and the February 1984 **Apple Orchard** will appear on January 24, a few days late. Must be something going on . . .

—PCW

System Saver® didn't become the Apple's number one selling* peripheral by being just a fan.

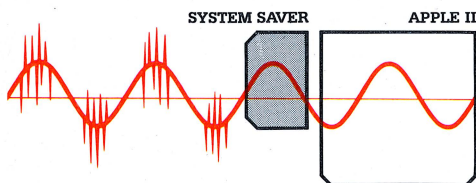
What made over 100,000 Apple® owners fall in love with System Saver? The answer is simple. It's the most versatile, most convenient, most useful peripheral ever made for the Apple.

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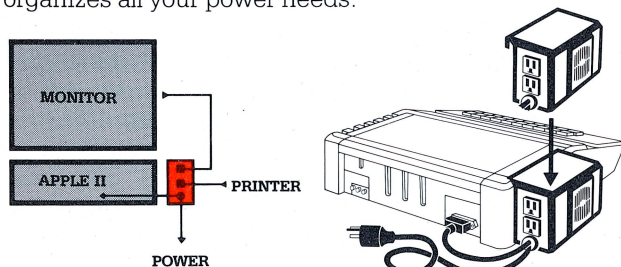
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 mHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable.



System Saver makes your Apple more convenient to use.

No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.

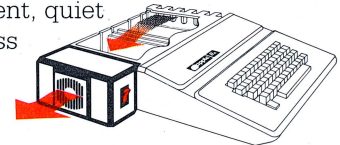


It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

System Saver lets your Apple keep its cool.

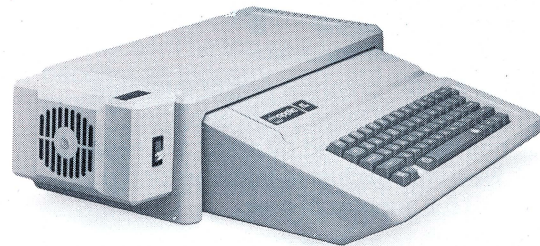
Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

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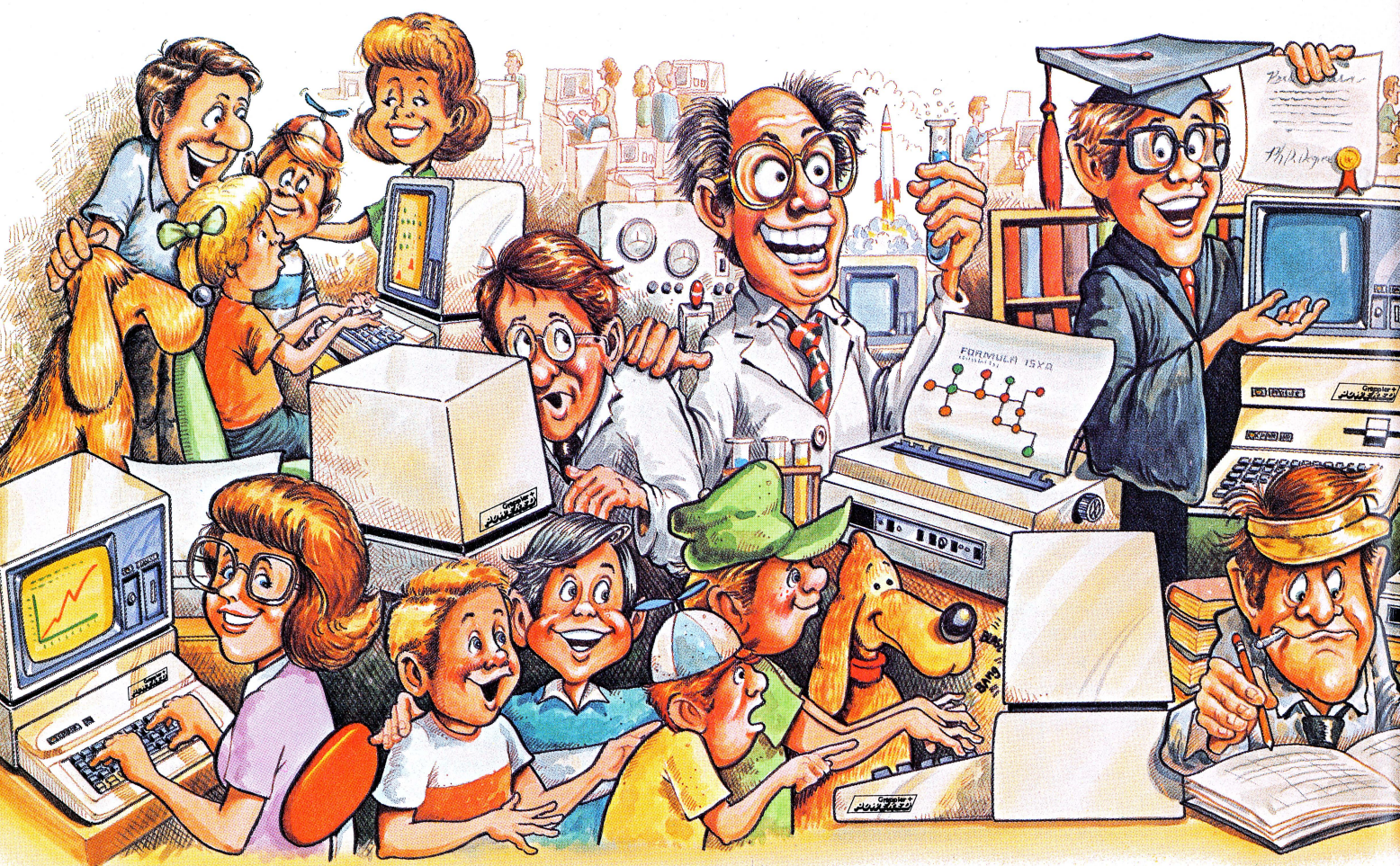
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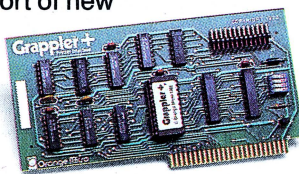
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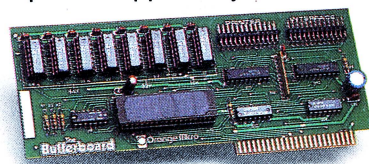
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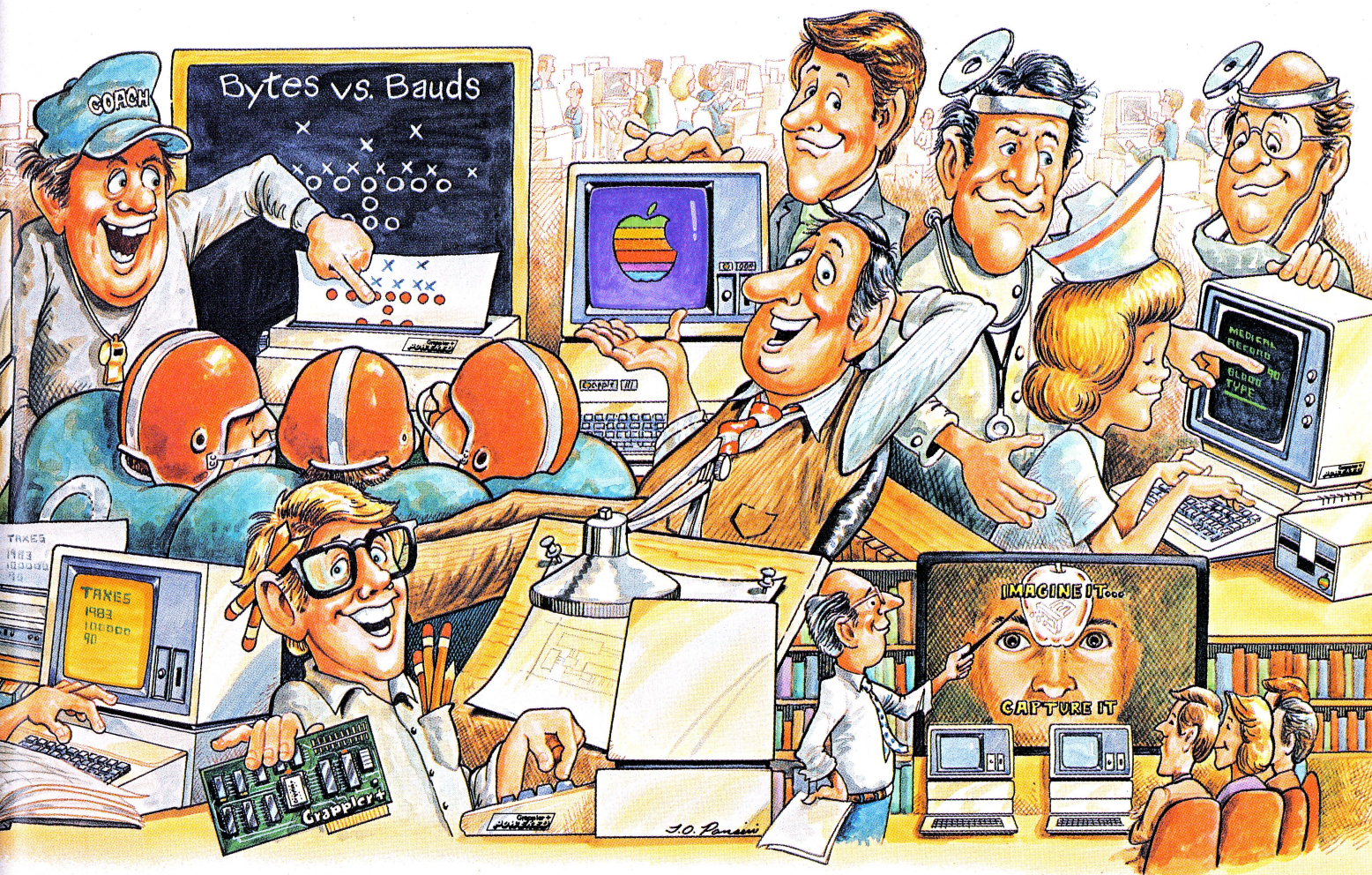
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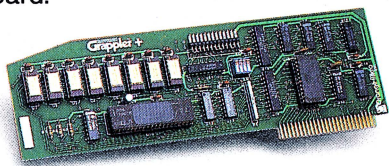
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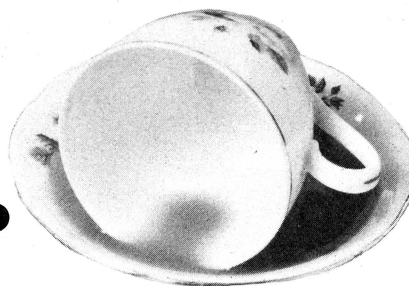


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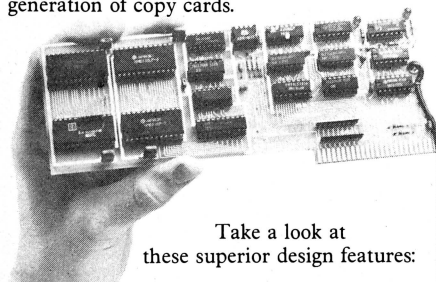
Accidents will happen...



Relax, you've got the Snapshot Copykit

We've taken the worry out of computer use. A damaged disk no longer means weeks of waiting for a costly replacement, because you can now backup your important software with the Snapshot Copykit.

Once again, Dark Star Systems have led the way with the introduction of the new generation of copy cards.



Take a look at these superior design features:

IT'S NEVER OUT OF DATE – The Snapshot Copykit exactly duplicates every byte of memory-resident programs up to 128k.

Other copy cards disturb several bytes of memory. Sophisticated copy protection schemes can detect these changes and make the resulting backup unusable.

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A full 8k of on-board memory will make the Snapshot Copykit particularly expandable for future use as a printer buffer, a multi-tasking system, a communications dispatcher and much more.

IT'S COMPATIBLE – The Snapshot Copykit is a board for all systems. It sits in any slot on the Apple IIe and II+ as well as the Basis 108, the Franklin Ace and other "look-alikes".

The Snapshot Copykit doesn't need a language/memory card and won't interfere with any of your other peripherals. So, you never need to remove it after installation.

IT'S USER-FRIENDLY – We have a well-deserved reputation for providing easy to use products. The Snapshot Copykit is no exception.

Other copy cards force you to use complex, unreliable procedures and repeated booting of "utility disks" to copy larger programs.

Old fashioned "nibble-copier" programs involve endless trial-and-error parameter changes before they will work.

The Snapshot Copykit will backup memory-resident programs up to 128k with one simple menu and one press of the trigger – in seconds!

IT'S POWERFUL – The Snapshot Copykit gives you back the power over your computer that copy-protected software took away.

You can interrupt a running program, copy it, list it, disassemble it, step and trace it, modify it and resume running it. Great for debugging and customizing!

The program is not disturbed in any way, even if you suspend it for a while to run another!

All backups made with the Snapshot Copykit are automatically BRUNnable files which you can transfer to hard disk. Its state-of-the-art compression facility lets you stack several backups on one floppy.

IT'S GUARANTEED – All our products are covered by a 90-day, no-quibble guarantee for defective parts.

We also support you with free technical advice – all owners of the Snapshot Copykit receive our consultancy hot-line number.

The Snapshot Copykit is the "ultimate unlock system" for programmers, business users and hobbyists. Find out more by calling or writing for our info packet and the latest news on software updates and other new products.

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Apple II, II+, IIe, Basis 108, Franklin Ace or other lookalike with disk drive.

PRICE: \$139.95

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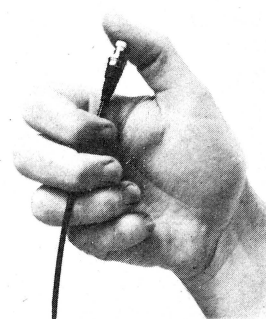
Apple II, II+ (RAMcard required – please specify brand when ordering), Basis 108, Franklin Ace or other lookalike with disk drive.

PRICE: \$119.95

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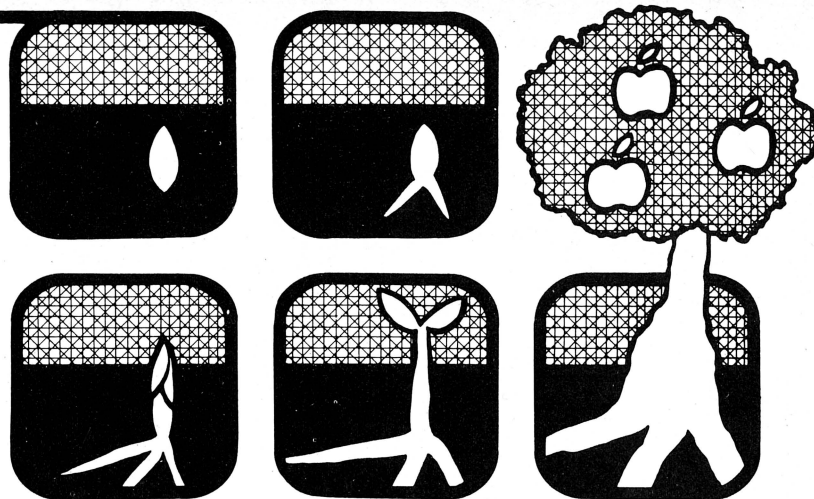
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Planting a seed...



The Eyestrain Machine?

The question before the House, quite literally, is "Are Video Terminals Safe?"

Literally, because the question is likely to be on the agendas of the U. S. Congress and many state legislatures during the next session. Some groups, including units of the AFL-CIO, are calling for government regulation of, and restrictions on, cathode ray tube displays (TVs) in the interest of safety and health. The political process is responding predictably; the prospect of state-imposed regulations (different in each state, of course), is not a far-fetched idea.

Some folks have been claiming for a while now that exposure to CRTs could cause everything from eyestrain to cataracts to blindness to defects in generations yet unborn. Reports and studies pro and con have been waved about, and we now have a real live controversy. Of such stuff are medical, political, and labor-leader careers made. Not to mention Eyewitness News: "You could be going *blind*! Details at Eleven!"

Yes, but does the CRT or VDT really cause health problems? Or are we looking at a larger picture in which the CRT plays a part? A recent report by the National Research Council contained essentially negative findings; there may be a problem, but it's not obvious even after much testing. More testing is required, they say.

Comes now the University of Kentucky, which has issued a report saying that those who look at VDTs on the job are risking eyestrain, eye irritation, blurred or deteriorating vision, and red eyes. Not to mention irritability, neck and shoulder pain, and fatigue. Well, UK isn't exactly unbiased here: they were retained by the Newspaper Guild (AFL-CIO) to study the problem. One precious fact emerged from the UK study: VDT users were absent from work slightly more often than non-users of VDT's. Further, VDT user absences tended to be a half-day longer.

Let's look at the absence thing first. Who operates most work-station CRTs? Some managers, true; but most of the people studied are clerical personnel, folks who find work with the CRT to be no more challenging than that of their paper-shuffling predecessors. Employee absenteeism rises where work is boring, non-challenging, etc. Is it the CRT? We really don't know.

Consider next the computer hobbyist or hacker. We all know people who are hunched over their Apples for hours on end, and who do not complain of CRT-related fatigue, shoulder pains, or eyestrain. (Irritability, when present, is usually directed at some unsolved bug.) The key seems to be that they're *challenged* by their work.

Another factor in the employment situation: working with (and for) a machine that will tell your boss exactly how much work you did that day, and how well, tends to decrease your fondness for that machine. The potential for magnification of possible problems is present; let's blame the machine.

Reports and studies will continue to bombard us, as will Eyewitness News. But we must also look at the psychological framework surrounding CRT use. Even absent CRTs, it's funny how students are more likely to develop eyestrain from Geometry texts than from *Flashing Swords*.

We're going to look into this further. If you'd like to help, drop us a line.

Reid Bigli

Introducing-ProDOS

by Morgan P. Caffrey

ProDOS is a much-improved operating system for the Apple II Plus and //e. It offers more features and responds to many questions and complaints made about the DOS 3.3 system over the years. And, although the changes are substantive, the new system will continue to run the vast majority of existing DOS 3.3 applications.

The main drawback is that some hardware may not be supported, and that a file conversion process is required. The conversion may be a difficult process with some copy-protected software. Apple has been cooperating for some time with software vendors to smooth out these problem areas. In fact, ProDOS has already begun to reach the computer store shelves. In some cases you might have purchased such an application and not even know it.

For those of you who are familiar with Apple ///'s SOS (Sophisticated Operating System) there will be few filing system surprises. ProDOS will happily read a disk formatted or written to under SOS, and SOS will as gladly read what ProDOS creates. For those of you working with Apple II Plus or //e and Apple ///, this means a simple method to pass data back and forth when necessary. This has been something of a thorn in the side of those who have purchased both machines. No more.

Before you groan and throw up your hands in the face of yet another operating system, Apple has taken some pains to make sure that programs written under Applesoft BASIC with DOS 3.3 commands imbedded will continue to work as before. Integer BASIC has been cast into the abyss. This will not please those who have invested time and effort into that speedy language, but change al-

ways pinches someone. In this case, it's a small but vocal percentage of the active owners, from whom we can expect to hear.

Let's look at the rough outlines. Apple-soft continues to function not only as well as ever (now, now — I said no groaning), but improved. Most every program you have will continue to run properly once it has been converted to ProDOS. Only those programs which made direct access to the DOS 3.3 directory with assembler augmentations, or which used the MON or NOMON debug features will need rewriting.

File Conventions

Diskettes are initialized with volume names and files are assigned a "type" characteristic. There are a great number of different file "types" available (TXT, BAS, SYS, BIN, DIR . . . etc.) Files are thus identified by pathnames which consist of "/volume-name/file-name/". The file type is not a part of the pathname. For instance, the diskette might be initialized with the volume name "MAILPROG". A file on the diskette might be called "FRIENDLIST". The full pathname to access the data in FRIENDLIST would be "/MAILPROG/FRIENDLIST". Since this is a somewhat lengthy typing process, a "PREFIX" can easily be established which allows you to type only the filename.

An extension not available previously in the Apple II series is the sub-directory. A sub-directory is a "DIR"-type file containing a list of files accessible only through this directory path. This means that a subdirectory file on MAILPROG might be titled "BUSINESS" and be of type: "DIR". When you access /MAILPROG/BUSINESS you access a list of other file titles, not visible with a

standard catalog. Thus you can view only that cluster of file information that you need. If the first file created with the /MAILPROG/BUSINESS directory were "PARTS", the pathname to access the parts-suppliers data would be: "/volume/sub-directory/filename/" (e.g. "/MAILPROG/BUSINESS/PARTS"). The pathname cannot exceed 64 characters. Since DOS 3.3 had no such mechanism for dividing types of files, existing applications can ignore this feature entirely. But once used, it is attractive and useful and you won't want to ignore it.

ProDOS has some good tools to manipulate the file environment. It has a FILER program that provides facilities to manipulate files. If you know Pascal or have worked with SOS this will hold no major surprises. It includes both volume and file commands.

The file commands provide for files to be viewed as a directory, copied, renamed, compared (nice), deleted, write protected (and vice-versa). It also includes the ability to make a file which IS a directory. Volume commands provide facilities to format and/or copy volumes, change volume names, check for bad blocks, assess space usage and even compare whole volumes.

I am miffed that no facility was included to copy a text file to the screen, as with the TYPE command in CP/M. This means someone will have to write a separate program to perform the frequently needed task of simply seeing what a file contains. Grrr!!.

The format routine does a disk speed test when copying or formatting. My old drives were somewhat cantankerous so I had them aligned last month. All my other programs were working fine. Since ProDOS refused to format or copy until I readjusted the speed, I couldn't

even back up the originals until I made a trip to the service center. This kind of "help" I don't enjoy. On the other hand, nobody is going to format a diskette which another ProDOS system can't read because of speed discrepancies, which eliminates a problem that existed under DOS 3.3.

So, here you are with several years, or months, of working programs and you want to make the leap to ProDOS. Well, not just yet. This system is presently in the hands of licensed program developers, but won't be released to the buying public until sometime in '84. The convert program will grab files from DOS 3.3 diskettes and write to ProDOS diskettes. It will also transfer from ProDOS to DOS 3.3. That's just fine. It took MicroSoft two years to get that little feature (CP/M to DOS 3.3 transfer) to Z-80 card buyers.

Hardware

Clocks

If you have a THUNDERCLOCK in your system, ProDOS will take note, set the system time, and properly date-stamp any file's origin and last modification date. BASIC programs can make usual use of the clocks. We tried the Thunderclock, and it worked just fine.

//e 64K Extended 80 column cards

If you have a 128K Apple //e, ProDOS assigns the additional space as a RAM volume whose volume name is "/RAM". ProDOS uses as much space as it can find on the card for files. It is quite fast. For applications requiring frequent disk access to a smallish amount of data (maximum is 63K) this is ideal. This requires either the program or the FILER to transfer data from a disk volume to the /RAM volume at the start, and reversal of the procedure before shutting the system down. Lots of room for experimentation here.

Disk Drives

ProDOS "believes" to the depths of its soul that a floppy disk contains 35 tracks of 16 sectors. No more, no less, no other way. DOS 3.3 in Apple's native mode is that way too. Some other disk drive manufacturers, however, have managed to patch DOS 3.3 to enable larger amounts of storage, up to 40 tracks. These manufacturers will have to find a different way to patch ProDOS. And it may not be as easy this time because the method of

tracking the available space (called the Volume Table of Contents) appears to be more rigid than was DOS 3.3.

For the BASIC Programmer

Again, everything, or very nearly everything, already written should work properly. But there are subtle advances in this ubiquitous and sometimes aggravating language.

A small regret: The useful commands "MON C,I,O" and "NOMON" have been removed. When I worked with Applesoft a lot, this command really made a difference in debugging file-processing applications. It was unique among the BASIC languages I have worked with and was very useful. It was sacrificed to obtain space.

Random Access Files

Most of my best work in Applesoft file processing was done using random access mode (When allowed a choice I choose block-structured languages now). ProDOS stores the original record size when the file is created, normally reopens the file with its original logical length and yet allows the program to

temporarily use a different record size at need. This flexibility will be a great help.

Random access read and write commands now include a field option ("Fn") which will skip past "Fn" carriage returns (field separator) in a record. This is akin to the old "B" options which moved the file pointer to the Bth position in the file or record. This only works for fields separated by a carriage return. For those who have used the comma as the field separator, the older problems still remain.

APPEND can now be used to add to random access files too.

FLUSH is a new command which allows the program to insure that all data supposedly written to disk is actually sent to the disk. For those of you who haven't dealt with this problem this may seem confusing. It minimizes the effects of occasional power failures.

STORE and RESTORE

When I first wrote programs which interacted with the cassette interface, I occasionally used these commands. STORE saved all the values of the members of an array to cassette and, if I read

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back the same values in the same sequence after carefully declaring each variable in the same way, RESTORE would retrieve the data. Nice, but not very. Too messy and error prone. These commands have been improved to the point of great utility.

Now, STORE saves all the values *along with the name* of all variables in a program to a disk file (a special compacted type called "VAR"). RESTORE, naturally enough, grabs the data from the disk and creates the variables in a program. It also clears all variables from memory before it does it, however, so watch your step.

CHAIN

CHAIN allows program segmentation and run-time linking. Thus a program which is really larger than memory can be run in segments. The problem is, without CHAIN the RUN command always clears the variables declared in a previous program and a lot of program space is wasted re-declaring variables. Several Applesoft augmentation packages have included chaining because of user demand. CHAIN loads and runs a program on disk without losing the variables currently in memory. You can

even select the line number in the chained program to begin executing.

IN# and PR#

These two Apple-unique commands have the original meaning of directing character output to a slot device (PR#) and character input from a slot device (IN#) but have been neatly augmented to allow a routine at any address in RAM to gain control. Thus if a card is installed without ROM it can be controlled from a RAM routine. You could do this before but it wasn't as easy. This simplifies things.

The "-" command is a smart RUN command. With the phrase "-filename", you tell ProDOS to load and execute the named file. It is ProDOS's business to figure out if the file should be RUN, BRUN or EXECed. You don't have to think about the type of file in order to run the program.

CREATE

This new command allows a program to create a sub-directory, thus grouping

related files. This is especially helpful as the number of hard (difficult?) disks in use increases. It reduces the number of times the end-user has to look at a forest of filenames while looking for a single file. Or at least, with good programming, it *can* lead to that result.

PREFIX

Another new command which allows the user or program to assign a filename prefix value to the pathname. Thereafter only the end-portion of a file pathname need be used.

BSAVE and BLOAD and BRUN


The first two commands are used to save (BSAVE) a region of memory to disk along with the information necessary to return (BLOAD) the memory contents to the exact same memory location. They can be used to save assembler programs, graphics images, etc. BRUN does a BLOAD and executes the file as an assembler program.

The BLOAD command was always slightly difficult to use. It required the user to know not only the beginning location, but the number of characters to be saved. It has been improved in terms of ease of use and in terms of flexibility. You will still need to study the options to make best use but this is a real improvement.

For the technically oriented, the nicest change allows an image to have a beginning and ending address instead of a beginning address and character count. The old method is also honored. The images may also be sent to a byte-position within an existing file. This last is flexible but slightly dangerous. It will be easy to make a small mistake and write over a valuable bit of code or binary image. It will save some storage space since multiple binary images can be stored under a single filename. BLOAD can load any file type to any location and as indicated with BSAVE, portions of files can be BLOADED. With power comes responsibility to be careful.

TRACE

TRACE has been fixed so that it will work appropriately with active DOS commands. There were tricky ways to make this work before but this normalizes the procedure of following the program logic during program execution to discover and fix bugs.



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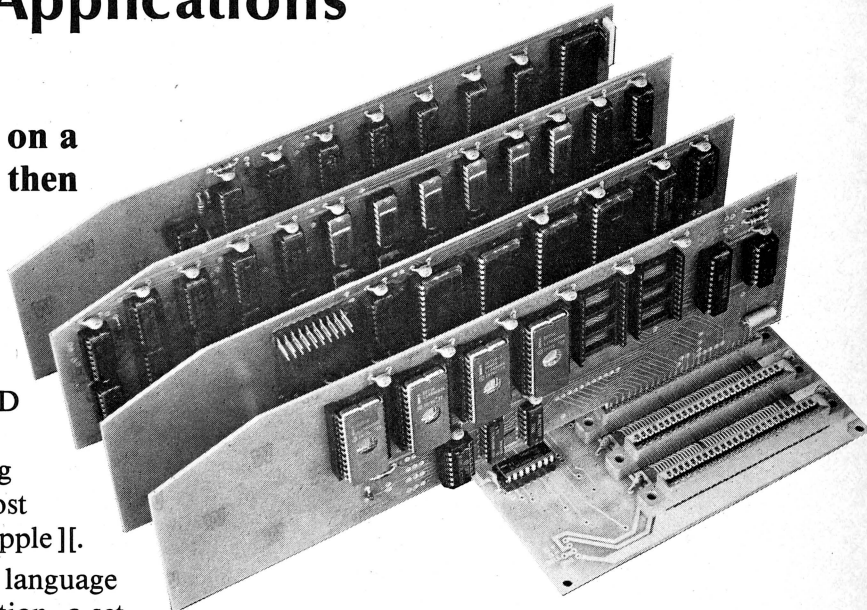
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Garbage Collection

Applesoft (and many other Microsoft BASICs) has a flexible set of string-handling commands. The penalty for this flexibility was a lengthy process of culling active strings from a mass of ghost-strings to regain temporary storage space. The process, known as "garbage collection", could take many minutes. ProDOS has a few other memory management problems to take care of and this capacity has been included, reducing the time needed for this process to just a few seconds. This is a real boon.

Machine-Language Interface

Things get a bit difficult here. MAXFILES has been thrown away (using a de facto max of 8 files) and ProDOS adjusts HIMEM and the ProDOS memory bit-map each time it opens a new file. All machine language programs must be loaded before any file that requires such bit-map adjustment is opened. More on this as I get to understand the consequences better.

Using the System (and sub) Directory

Applesoft programs can easily review the contents of the main or any sub-directory. Any time a directory file is opened, ProDOS will read and pass the information in the file back to the program in text form, as it appears on the screen. Apple has published all the information necessary to get most pertinent information about files on the volume or files in a sub-directory into a BASIC program. This was a long arduous task under DOS 3.3 with Apple fighting every inch of the way. Even here, it does not provide the beginning block number of storage on the diskette. Ah well, something for the kids to do on an idle evening or two.

Assembler Programmers

Although we don't yet know exactly how the TOOLS and UTILITIES diskette will be vended, this second disk provides program developers with an assembler (a somewhat enhanced DOS TOOLKIT). The enhancements are subtle, useful and will not be covered here except to exclaim sadly that they do NOT include a macro facility and happily that the system DOES include a relocating loader.

Oh well, a few more details can't hurt. The listings can include a cycle counter for each instruction for timing-critical code. Provisions have been included to allow the sophisticated user to add assembler mnemonics and addressing modes to handle the newer 6502X microprocessor. The 16-bit emulator SWEET16 is included.

There is also an Assembly language debugger called BUGBYTER. It is an excellent tool and a great addition to this system (I speak here as a fan). It allows for multiple break-points, constantly displays the contents of all registers, allows user-selectable views of the hardware stack, and subtle views of memory locations, either as full addresses (appropriately dealing with the 6502s special zero-page characteristics) or as the contents pointed to by the contents of an address. The debugger quickly became intuitive when I first began to use it. I have debugged straight assembler and even used it to single step through timing-critical FORTH programs quickly identifying and fixing bugs.

System Calls

When working with DOS 3.3 as an assembler programmer we could make good use of RWTS (the primitive routine to read or write data to a particular track/sector) but Apple would say almost nothing about DOS operation. A now-famous book was required to open the secrets of the file manager. Now, this information is in wide-spread use.

No such secrecy with ProDOS. The system calls are freely available and programmers are encouraged to become proficient in their use. They are a limited sub-set of the SOS system calls, having the same names and same value.

A system call is made by loading a register (or registers) with a specific value to identify the desired function and the a jump is made to a dispatch routine which performs the function and returns a success/failure flag and optionally a set of results.

Also included in the TOOLS package is the ProDOS Machine-Language Exerciser. This is a menu-drive program which allows the knowledgeable assembler programmer to practice ProDOS system calls without having to write an interpreter. This makes it possible to test the behavior of a sequence of calls prior to implementing calls.

Interrupts

ProDOS reportedly supports up to four sources of interrupts simultaneously. It has a defined protocol for handling these interrupts which services the interrupts in the order in which the code is installed into ProDOS. I am frankly skeptical. There is a basic flaw in the F8 (monitor) ROM which makes almost inevitable a system conflict at some time or other. I heartily applaud the inclusion of a method to handle this extremely useful mechanism. I also await more information on how to overcome the flaw. This flaw exists in all Apple II, II Plus and //e ROMs and has been documented in a number of places as the "location \$45 problem".

Conclusion

Bottom Line: ProDOS was created because of limitations in DOS 3.3, particularly in operating ProFiles and other hard disks with Apple IIs. It will not require internal hardware changes to move from DOS 3.3 to ProDOS. Many software producers will use it, and you may not even know it. When it becomes available, try it; there are many improvements.



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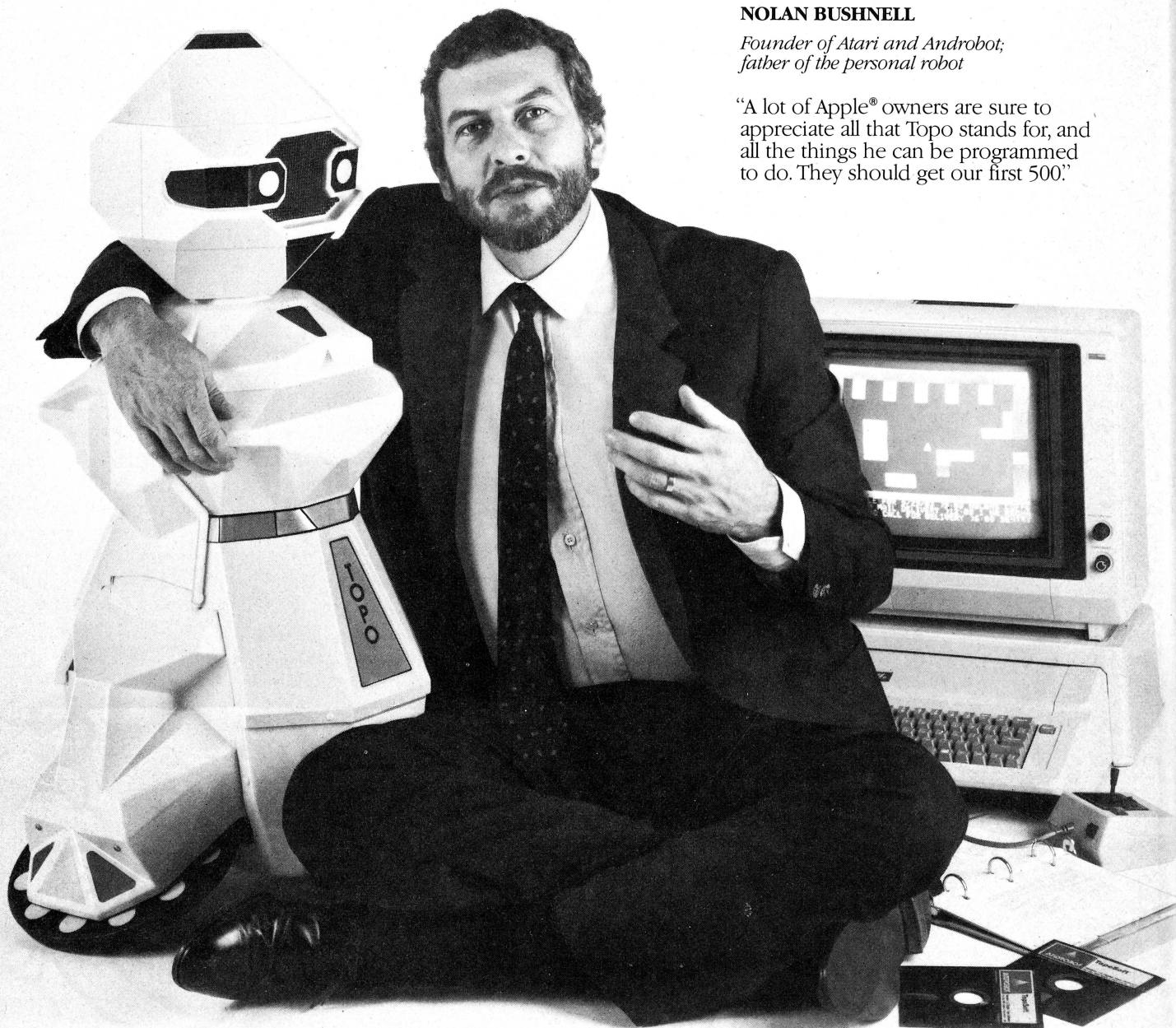
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ANDROBOT™

San Francisco was recently able to show off its massive Moscone Convention Center, or more accurately, *half* of the center, as thousands of people were willing to pay ten dollars for a single day's look at a real, live AppleFest. (Three day tickets were also on sale for twenty-five dollars.)

This particular 'Fest had not appeared to have grown substantially from previous years, but it is doubtful that there were any complaints from the crowd on this score; there seemed to be something there for just about anyone's taste!

Earlier shows had the "promise" of things to come as dealers used the occasion of these somewhat infrequent expositions to introduce and highlight new products. In this show were a number of vendors whose new products included a plug-in CP/M board for the Apple /// that will have all required memory on the board to avoid problems with I/O (The board wasn't quite ready to ship as testing was still underway). There was a very convincing Flow Charting package working on an Apple II/Plus/e that kept crowds packed at the monitors. There was even a Kroy (lettering machine) being "driven" by an Apple II. Several 68000 board/systems were on display,

Reflections On An Applefest

by Gene Wilson

and plug-in keyboards seemed to have found a good response.

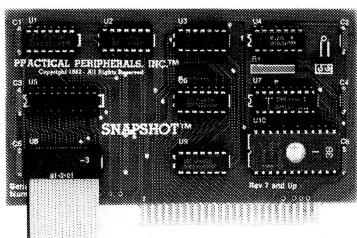
At the same time, it appeared that many manufacturers, software houses, and vendors were elsewhere for those three days. Their support seems to be shifting away to the really large gatherings. Perhaps the cost of attending a large number of shows has caused the

thinning of the ranks of those who "show" in favor of those who "sell".

In many ways, this 'Fest took on the look of a mass marketing operation, with a sort of a "high-tech K-Mart" type of look at sales. This was the year of the "discount"; discount computer furniture, discount computer books, discount floppy disk drives (in any size from "slim" to "six-pack"), discount printers (you name it, from dot matrix to ink jet), discount software packages . . . from one end of the hall to the other. The most significant display tool seemed to be the vendor's use of one (or more) of those new "chalk boards" that uses the "multi-colored markers" to list products and prices. If a trip to competitors' booths disclosed a lower price elsewhere, it then took only a few precious seconds to change the numbers to get the sales going again!

On a positive note, Apple Computer's presence could only be described as "fully committed". Their booth was large, well stocked and well staffed, LISA, Apple///, and the //e were all shown with pride and enthusiasm. The staff folks were dedicated and determined. I must admit at this point that I'm also dedicated and determined, and manufacturers' representatives are usually in for a rough set of questions. I don't like people trying to quote from meaningless press releases, or faking knowledge they don't have. Apple's people are well trained and *very* knowledgeable in their particular skill areas. Someone in Cupertino has been gratifyingly busy 'polishing' their Apple!

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Snapshot for Apple II PLUS reduced to \$69

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The signal conditioner's outputs are a high quality 16 pin gold I.C. socket that matches the one on the A/D's so a simple ribbon cable connects the two. The signal conditioner can be powered by your Apple or from an external supply.

FEATURES

- 4.5" square for standard card cage and 4 mounting holes for standard mounting. The signal conditioner does not plug into the Apple, it can be located up to ½ mile away from the A/D.
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E-Z Card

Review by Woody Liswood

Manufactured by:
Orbital Systems, Inc.
P. O. Box 5277
Mesa, Arizona 85203
(800) 221 - 9280

SO, YOU ASK, just what is an E-Z Card? It is a Z-80 card for your Apple Computer which allows you to run CP/M based software. And what is so special about the E-Z Card? Two things. It is very low priced, and it is even lower priced, if you put it together yourself.

Does it work? YES. I put one together and it ran the first time. It has been in use for over a month now with no problems. It runs everything that my Microsoft Z-80 card runs and, according to Andy Niemic, the President of Orbital Systems, draws far less power than my old card.

Some other goodies: It has a lifetime guarantee. That means if it stops working some day, send it back to Orbital and they will repair it for you.

The cost of the kit is \$65. If you wish, you can purchase it for \$90 already completed and ready for use.

Was it hard to assemble? NO. From the time I plugged in the soldering iron, to the time I inserted the card into my Apple, only about 45 minutes had passed. That 45 minutes also included reading the instructions.

Documentation

The package contained a printed circuit board with a silk screen mask for all of the parts. It is almost impossible to put the thing together incorrectly. The hardest part was reading the color codes on the resistors so that I was certain that I was putting the correct resistor in the correct place on the board.

The instructions also contain a full page well drawn picture of the E-Z CARD with all of the parts labeled as to where they really go on the board. That, plus the easy to read instructions should eliminate any problems you might have in determining what to do with what. I never looked at that illustration until after I had completed the board. The instructions were so good that I just did not need to see an illustration.

If you have not assembled a kit before, I would plan on about twice the time I spent. You should first practice soldering on some old wires before you attack the kit. However, if you have a friend who has done this before, then one or two

minutes of demonstration will go a long way to relieve your fear of messing things up.

When I first received the kit, the documentation said that the sockets used to insert the IC's were optional. Orbital charged an additional \$5 for the socket set. I made the comment to them that only the dumbest folks in the world will solder an IC directly to a circuit board (e.g. the memory in an IBM PC). and that I was going to recommend in this article that you *always* purchase the socket set with the kit. They called me back and told me that because of my comments they were going to include the socket set as a standard part of their package.

If my count is correct there are 52 things to solder to the board, 11 of them are sockets and the rest are resistors, capacitors, an LED and a transistor.

Equipment

You will need a pencil type of soldering iron, for printed circuit board work. These run 25 to 60 watts. Don't try to work on PC boards with a soldering gun; that's like a surgeon taking out an appendix with a cleaver. You will need a rather small tip at the end of the iron so that you can place solder on the small legs of the sockets as they appear on the back side of board.

You will need some 60 - 40 rosin core solder. That's 60 per cent tin, 40 per cent lead, best for electronic work. Do not use acid core solder, and don't use soldering paste fluxes.

You will need a small diagonal cutting pliers so that you can cut off the excess ends of resistor and capacitor leads after you solder them into place.

You should also have some sort of solder cleaner so that you can spray the back of the board after you are done to remove the excess rosin left on the back of the board after you are finished.

Optional Equipment

If you are doing this for the first time, you should also get a soldering iron holder with a sponge so that you can clean the tip of the iron from time to time. I also used a small needle-nose pliers to bend the resistors and capacitors to fit the spacing in the board. You can do a more than adequate job with your fingers, but I like being a Virgo about such things and try to make the board look as neat as possible.

I did not use any vise or clamp to hold the board firm. It seemed to work better, for this kit, to do the work directly on a table top. (Protect the table top from burns, however.) If you're just starting, you might like to clamp the board down so that if you press too hard with the iron, your work will not take off across the room.

I priced these goodies at my local Radio Shack store. You should be able to purchase all of the equipment you need to assemble the kit for under \$30. That still makes the kit a superb buy and you now have the equipment necessary to build other kits.

Problems

I had no problems with the instructions or the kit. However, I did not follow the instructions completely and the first time I assembled one kit it did not run. What I had done was to place the LED in backwards. The instructions clearly said that the flat end of the LED was to be facing the bottom edge of the board. And, the silk screen diagram on the board itself showed the flat edge on the bottom. Part of my being was somewhere else when I put the LED in; it was backwards.

Recommendation

If you need a CPM card, this is the best deal I have found. The kit was **fun** to assemble. It worked. It was cheap. What more would you want? Even if you do not want to have the fun of assembly, the completed board is cheaper than others on the market.


Let me quote you part of a letter I received from Andy Neimec:

"We started our company with the idea that we could manufacture products and charge a fair price, a price that reflected the actual cost of producing that product. Today the consumer is asked to pay prices that have no relationship to production costs. We were sure that everyone would 'beat a path to our door' when they saw our prices. We took care not to cut corners and to make a quality product. To our surprise, we found people to be apprehensive because our prices appeared to be low. We have no plans to raise our prices, instead we are hoping by word of mouth and people like yourself, to get the word out that our products not only work, but the quality was not cut because our prices were fair."

Amen. I recommend their product.

In addition, they also produce some other boards. They make a WISHCARD for \$50 which will make back-up copies of your single-load protected disks; A CPM card for the //e; an 80 column card with 64K memory for the //e for \$99 (I will report on that one in a future article); a 80/132 column card for the II for about \$100, and a 128K card with built in disk drive for the II for about \$200. I will try to get and put together all of these cards as they become available and will report to you about each of them. I suspect, after my initial experience that they all will work rather well.

Conclusion

I haven't had so much fun since I first purchased my Apple a number of years ago. I had forgotten what it meant to put something together with my hands. I was becoming a "user." Well, I am still a user, but a self-satisfied one. 

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Is CP/M For You?

Andrew P. Niemic

President, Orbital Systems, Inc.

IS CP/M FOR YOU?

by Andrew P. Niemic
President, Orbital Systems, Inc.

Is the benefit of CP/M worth the cost? The answer is without question, "YES"! The main reason more Apple owners are not into CP/M is the cost of the required hardware. Until now, to get started, you had to spend around \$800.00 to purchase a CP/M (Z-80) and an 80 column card. If your budget is like mine, this was a strong deterrent even though there is a vast quantity of powerful CP/M programs available on the market such as Wordstar, Multiplan, and dBase II.

A strong selling point for the Apple has always been the large quantity of software available. Most Apple owners do not realize the large quantity of CP/M software available for the Apple. To a great extent, these CP/M programs are business oriented but provide the user with very professional programs. An additional enhancement to the Apple's CP/M is the ability to interface with other CP/M computers. With CP/M installed in the Apple, it is easier and less complicated to interface with other CP/M systems, making information transfer possible with other micro's, mini's, or mainframes.

My company produces a high quality CP/M and 80 column card for a total retail cost of less than \$175.00. Now Apple owners can have the best of two worlds, CP/M and Applesoft. Both of these cards are designed to operate with the Apple II, Apple II Plus, Franklin, and other Apple gender computers. By the way, you may have heard that some of the CP/M cards do not operate properly on the Apple //e. Orbital Systems has designed and developed a special CP/M card specifically to operate on the //e.

To be more specific about the cards themselves:

The CP/M card uses version 2.2; the majority of CP/M software on the market uses this version. The latest version CP/M, version 3.0, executes programs faster, but has been found to not be compatible with some Apple hardware. Version 3.0 may, in the future, become the prime version for marketed CP/M software.

The 80 column card can be used with or without the CP/M card. It produces a clean set of characters with true lower case descenders. The board is designed to run 80 columns separately or in conjunction with the CP/M card, (most CP/M software is designed to run in 80 column screen display). An optional add-on feature to the Orbital 80 column card is the ability to display 66, or 132 columns, as well as the standard 80 columns.

Both of these cards are available either factory wired, or, (if you like to build electronic devices), in kit form.

If you still have not decided that CP/M is for you, let me provide some additional facts.

- The cost of getting started is as low as I believe it will ever be.
- The use of CP/M on the Apple is expanding, as can be seen by the increased sales of CP/M software.
- With the continued growth of CP/M, the large number of users will stimulate the development of more CP/M programs.
- Adding CP/M will increase the value and utility of your computer.
- CP/M is an industry standard, making your system more compatible with other CP/M computers.
- CP/M offers new challenges and dimensions for personal computers, programmers, and users.

I would like to leave you with these last thoughts. When you buy software or hardware that expands your computer, it becomes a personal learning experience. You invested many dollars in your computer(s) and you should get the best value for your investment (there is more to a computer than playing games). There are many computers on the market today and Apple is just one of them. CP/M is the main operating system of many of these computers and having the ability to communicate between them is an additional asset. If two communicating computers use the same operating system, the problems of adjusting program code from one machine to another are reduced. I feel that CP/M expands the horizons of the Apple, and those waiting too long will find it difficult to catch up.

Editor's Note: Andy's commitment to the Apple II and to CP/M has caused him to offer Apple II owners a more cost effective means of solving problems.

In future months, we will be giving glimpses into some of the other faces of the Apple CP/M world. For example, did you know that there will soon be an "Applicard" available for the Apple /// that will have RAM for the entire CP/M operating system all on the card, and the on-board Z-80 microprocessor will operate at 6MHz? And speaking of the Apple ///, we'll show you the hardware "patch" for the Softcard that will allow it to work with the Profile hard disk. We'll even look at how CP/M programs must "interface" with the Apple ///'s ".CONSOLE" (that's pronounced "dot console") driver to work. There are some very interesting CP/M applications that we'll look at in great detail.

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True Sixteen-Color Hi-Res

by Allen Watson III

If you are familiar with the graphics displays on the Apple II, you have probably wished that the sixteen colors available in the low-resolution display were also available in high resolution. With the Apple IIe, your wish has come true. If you have an Apple IIe with a 64K RAM card, all you have to do is wave the magic wand—pardon me, I mean load some software—to be able to generate high-resolution graphics with sixteen solid colors that are the same as the sixteen colors in the standard Lo-Res display.

I have to specify “solid” for these colors because of the many existing programs that use color mixtures or patterns (something like coarse half-tone reproduction) to extend the standard six colors. If such color mixtures appeal to you, just think of how many combinations you can make using sixteen colors.

To display sixteen-color Hi-Res you need three things:

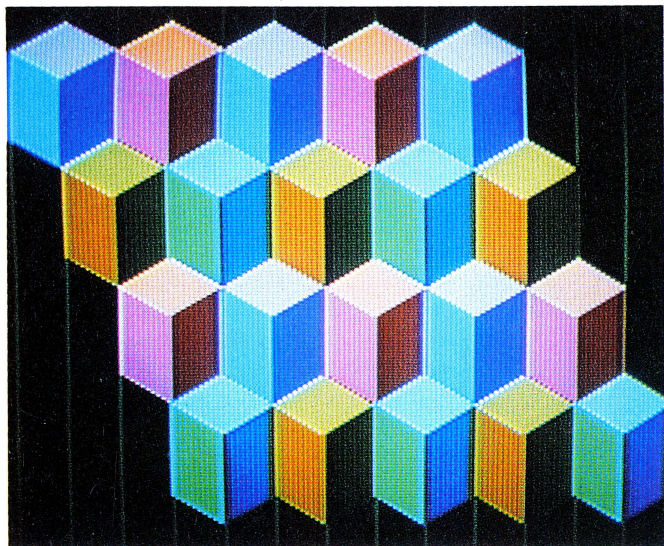
- an Apple IIe configured for double Hi-Res;
- software to draw the dot patterns that generate the colors; and
- a color TV set and RF modulator or a composite (NTSC) color monitor.

This article tells how the Apple IIe generates a sixteen-color Hi-Res display and includes machine-language subroutines you can use to add sixteen-color Hi-Res to your Applesoft programs.

A Little About the Color Dots

In the standard Hi-Res display, each pair of adjacent dots makes a pattern that a TV set displays as color. The four possible combinations of the two dots should produce only four colors including black and white, but the Apple II has a special circuit that shifts the dots slightly to produce two more colors, giving a total of six.

Where the standard Hi-Res display puts 280 dots across the screen, the double Hi-Res display puts 560 dots across the screen. With twice as many dots, it takes four adjacent dots to make a pattern that the TV set displays as color. There are sixteen possible ways four dots can be on and off, making sixteen possible colors. The colors generated this way are the same as the colors in standard Lo-Res graphics: black, white, two grays that look the same, and twelve chromatic colors.



Sixteen-Color Graphics Is Better

Sixteen-color Hi-Res not only gives you more colors than standard Hi-Res, it also lets you display any combination of those colors with no limitations. That's right: it doesn't make those orange stair-steps you get in standard Hi-Res every time you draw a diagonal blue line on a green background.

The color limitation in standard Hi-Res is due to the dot-shift technique that the Apple II uses to obtain the second pair of Hi-Res colors. That technique also causes a second, more subtle problem: when using the dot-shift colors, the last dot from each byte is only half the normal width, and hence dim. Double Hi-Res mode dispenses with the dot shift entirely, so it is free from this defect.

One of the defects of standard Hi-Res is actually the fault of the Hi-Res subroutines in Applesoft. In order to make line drawing as quick as possible, the subroutines draw lines only one dot wide. This causes problems with colored lines: vertical lines in some positions don't show, and nearly vertical lines have gaps in them. The subroutines supplied with this article give the user a choice of two line widths: one dot wide, for 560-dot resolution black and white, and four dots wide, for colored lines with no gaps. Table 1 lists the defects of standard Hi-Res graphics that are corrected in double Hi-Res.

Hardware Required for the Double Hi-Res Display

The hardware required for the double Hi-Res display consists of:

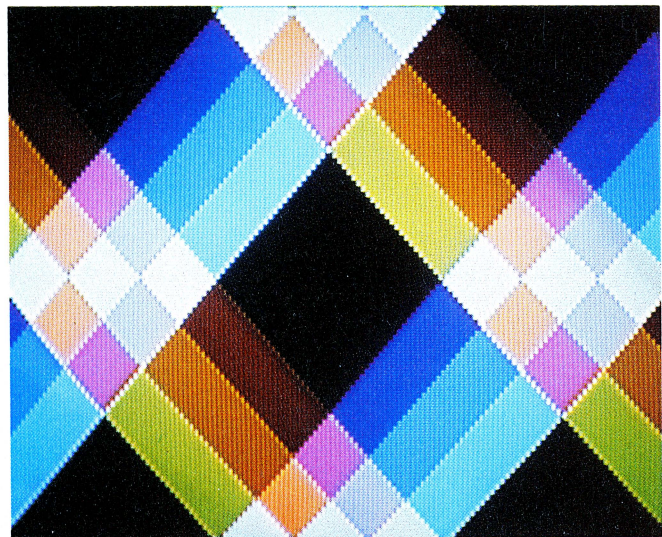
- an Apple //e with Rev B (or later) main logic board;
- the Extended 80-column text card installed in the Auxiliary slot;
- the Jumper installed on the extended 80-column card.

You can find the revision level of your Apple //e by removing the cover and looking along the back of the main logic board, under the words "Apple Computer Inc." On a Revision-B machine, you'll see the part number 820-0064-B. If your Apple //e has a part number ending with A and you want to use the double Hi-Res display, you'll have to do two things: (1) purchase an Extended 80-Column Text Card, and then (2) see your dealer to have a Revision B board installed in your Apple //e.

At last count, authorized Apple dealers were upgrading Revision A boards to Revision B with no charge for Apple //e owners who can demonstrate a need for it. Take this article along to show the dealer why you need it.

WARNING: If the main logic board in your Apple //e is Revision A, don't install an auxiliary card with the jumper installed. If you do, your Apple //e won't work.

For the double Hi-Res display to work, you need to install a card that has memory in the Hi-Res page addresses into the Auxiliary Slot. In addition to the requisite memory, the card must also have a jumper that connects pins 50 and 55 of the Auxiliary Slot. The Apple Extended 80-Column Text Card meets both these requirements.



Applesoft HGR routines

Some vertical colored lines don't appear.

Near-vertical colored lines are broken.

Line drawing doesn't always use latest color (you must use HPLLOT first).

Some colors cannot appear next to each other in some positions.

Diagonal lines have extra dots, making them look bumpy.

With shifted colors, bits on right-hand byte boundaries display as half-width dots and look dim.

Sixteen-Color Subroutines

All vertical colored lines appear.

Near-vertical colored lines are solid.

Line-drawing routine always uses the latest color.

Any colors can appear next to each other in any positions.

Diagonal lines don't have extra dots.

Doesn't use color shifting, so dot width is not affected by bit position in byte.

Table 1. Comparison of problems with standard Hi-Res displays.

If you want to find out the reasons for these requirements, read the sidebar about the hardware and the section on selecting double Hi-Res from a program.

The Sixteen-Color Hi-Res Subroutines

The subroutines in Listing 1 provide a way for you to start programming with double Hi-Res displays. The main features of the subroutines are:

- Drawing dots and lines in black and white with horizontal resolution of 560.

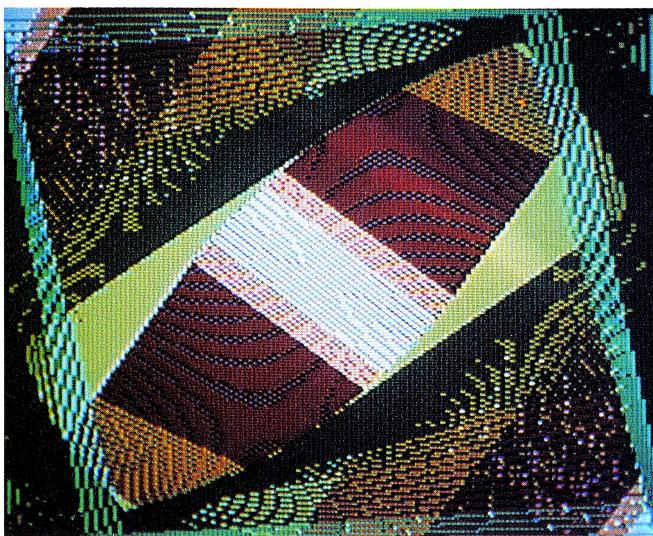
- Drawing dots and lines in any of the sixteen standard Lo-Res colors with effective resolution between 140 and 560, depending on the colors used.
- Overcoming certain limitations of standard Applesoft Hi-Res graphics, as shown in Table 1.
- Supporting Applesoft programs via ampersand statements, as shown in Table 2.

The subroutines give you a choice of two line widths for drawing dots and lines. To set the line width to 1 for high-resolution black-and-white displays, use the **& PEN** statement. To set the line width to 4 for color, use the **& BRUSH** statement. You can switch from one width to the other at any time. Drawing with four dots makes a point or line visible in any position, no matter what color it is.

(Note: In Brush mode, you can put a wide dot or line on any 560-dot boundary. However, some colors will not give you the full 560-dot resolution, because with color some dots are on and others are off, as explained in the sidebar on color. That's show biz.)

& DG	Initializes the double Hi-Res display.
& PEN	Sets the line width to 1 for 560-dot horizontal resolution.
& BRUSH	Sets the line width to 4 for 16-color plotting.
& HUE c	Sets the color for subsequent commands. Standard color values are 0 to 15. A value of 128 or greater selects reverse drawing.
& BKGND	Sets the entire display to the current color.
& DOT AT x,y	Draws a dot of the current color at position (x,y), with x between 0 and 559, y between 0 and 191.
& LINE TO x,y	Draws a line of the current color from the last position to position (x,y), with x between 0 and 559, y between 0 and 191.

Table 2. Ampersand statements for use in Applesoft programs.



Assembling the Subroutines

The sixteen-color Hi-Res subroutines in Listing 1 are written in 6502 Assembly language using the EdAsm assembler in the Apple DOS Toolkit. When you assemble the subroutines, EdAsm creates a codefile whose name is the name of the source file plus the suffix **.OBJ0**; in this case, the name will be **LISTING 1.OBJ0**. You should use the **RENAME** command to change the name to something more appropriate. The demo programs load the subroutines under the name **NEW SUBS**.

Listing 1 shows the subroutines assembled with the origin at \$6000 (decimal 24576), just above the second Hi-Res graphics page. The code for the subroutines occupies 1,084 (hexadecimal \$43C) bytes. Unless your Applesoft programs are small enough that the program and variables will fit below the Hi-Res graphics Page 1, which starts at 8192 (hexadecimal \$2000), you should put the Applesoft variables safely above the subroutines by setting **LOMEM** to 25660.

If your Applesoft program alone is too large to fit below Hi-Res Page 1, you'll have to start the Applesoft program and data storage above it, at 16384 (\$4000). Because there is no Applesoft command to do this, you'll have to modify the Applesoft program and data pointers in page zero. Appendix H of the Applesoft BASIC Programmer's Reference Manual, Volume 2, lists the pertinent locations.

With the Applesoft program and data out of the space below Hi-Res Page 1, you can put the subroutines down there, say at 7000 (hexadecimal \$1B58), by changing the **ORG** statement in line 75 and re-assembling.

Loading the Subroutines

The subroutines include a routine that enables them to work with Applesoft programs via the ampersand statements listed in Table 2. To load the subroutines and activate the ampersand feature, use the **BRUN** command. To do this from your program, include the following statements near the beginning:

```
10 LET D$ = CHR$(13) + CHR$(4)
20 PRINT D$;"BRUN NEW SUBS"
```

(Note: This assumes that you have renamed the object file **NEW SUBS**.)

Once the subroutines are loaded and the ampersand feature is active, you can run Applesoft programs that use the ampersand statements for sixteen-color Hi-Res. You can also use the ampersand statements from the keyboard. As soon as you reset the machine or run any routines that use the ampersand feature for something else, the sixteen-color Hi-Res statements will not work any more; you'll have to activate the subroutines again with another **BRUN** statement.

If you want to use the subroutines with your machine-language programs, you can either incorporate them into your source files or load them separately. Notice that some of the entry points shown in the table at lines 186 to 194 pick up parameters from BASIC via the subroutine **DHFNS** and the Applesoft routine **GETBYT**. Your program should enter the subroutines after such calls, and with the parameters in the accumulator (for the color-setting routine at **DHCOLR1**) or in the accumulator and the index registers (for the dot-drawing routine at **DHPLT0** and the line-drawing routine at **DHLIN0**). The other subroutines (**DHINIT**, **DHBKG**, **DHPEN**, and **DHBRUSH**) take no parameters, so your program should call the same locations that BASIC uses.



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```

5  REM    16-Color Demo #1:
        Color Wheel

10  GOTO 1010
15  REM Circle subroutine
20  LET XO = XO + MX:YO = YO + MY

25  FOR CX = 0 TO R - 1
30  : LET CY = SQR (R * R - CX *
    CX)
35  : LET PX = CX + CX
40  : & DOT AT XO - PX,YO - CY
45  : & LINE TO XO - PX,YO + CY
50  : & DOT AT XO + PX,YO - CY
55  : & LINE TO XO + PX,YO + CY
60  NEXT
65  RETURN

1000 REM Main program start
1010 PRINT CHR$ (13); CHR$ (4);
    "BRUN NEW SUBS"
1020 & DG: & BRUSH
1030 LET XO = 0:YO = 0
1040 LET CX = CY = PX = QX = 0
1050 REM
    : CONSTANTS:
1060 : SX = 27:SY = 13.5
1070 : DX = 3 * SX:DY = 3 * SY
1080 : MX = 275:FX = 555
1090 : MY = 96:FY = 191
2000 REM Draw circles
2010 LET XO = 0:YO = 0
2020 & HUE = 10
2030 LET R = DX
2040 GOSUB 20
2050 LET XO = 0:YO = 0
2060 & HUE = 15
2070 LET R = DY
2080 GOSUB 20
3000 REM Draw color chips
3010 FOR I = 1 TO 12
3020 : READ C,NX,NY
3030 : LET XO = NX * DX
3040 : LET YO = NY * DY
3050 : LET R = SY
3060 : & HUE = C
3070 : GOSUB 20
3080 NEXT
10000 REM DATA: COLOR, NX, NY
10300 DATA 1,0,-2,8,-2,0,2,2,0,4
    ,0,2
10400 DATA 9,-1.07,-1.07,3,1.07,
    -1.07,12,-1.07,1.07,6,1.07,1
    .07
10500 DATA 11,0,-.95,13,-.95,0,7
    ,.95,0,14,0,.95

```

Listing 2

The BASIC Demo Programs

The photographs of sixteen-color Hi-Res displays that grace this article were created by Applesoft BASIC programs using the sixteen-color subroutines. Two of those programs are listed at the end of the article. You can use them as examples of the ampersand statements and as tests for your copy of the sixteen-color subroutines.

Listing 2 is a program named COLOR WHEEL. It draws a diagram (a cross between a color wheel and a paint box) showing the colors in their proper order, instead of the usual order of the color numbers. It draws the neutral shades white and gray as concentric discs on black, then draws the chromatic colors as smaller discs placed on the large discs according to their brightness. The standard Hi-Res colors green, purple, blue, and orange are medium-brightness colors, so they fall on the gray disc. The other colors come in pairs having the same hue but different brightnesses:

- dark red and pink (light red),
- brown (dark yellow) and yellow,
- dark blue and light blue, and
- dark green and light green.

Listing 3 is a program called CUBES that is a little more ambitious. It takes advantage of the brightness relationships of the colors to draw solid colored cubes. You can group the twelve chromatic colors to make four sets of three colors having similar hues but three different brightnesses, for example, dark blue, medium blue, and light blue. Depending on your taste in colors, the combination of dark red, purple, and pink may seem to be stretching the point, but the resulting picture makes a nice effect.

A Note About Text Displays

If you use the Applesoft TEXT statement to switch back to a text display after using double Hi-Res graphics, the display hardware will still be set to show 80 columns. If you don't have the 80-column firmware turned on, every other column will be meaningless characters from the auxiliary text page. To avoid getting this confused display, you should turn on the 80-column firmware before using the double Hi-Res display. To turn on the firmware, type

PR#3

If the firmware is already on but displaying in 40-column mode, press CONTROL-R to switch to the 80-column display. After that, typing TEXT during double Hi-Res displays will restore the correct 80-column display.

Another way to avoid getting the confused text display is to turn off the double Hi-Res mode by pressing CONTROL-RESET. That switches off the 80-column firmware, if it was on, and restores the 40-column display. It also sets Annunciator 3 back on, so you'll have to turn it off the next time you display double Hi-Res.

Writing Your Own Sixteen Color Routines

If you want to develop powerful programs with sixteen-color Hi-Res, the subroutines in Listing 1 are only a beginning. They are based on the Hi-Res routines used in Applesoft, which are described and listed in the manual for the Apple Programmer's Aid #1. I wrote the subroutines primarily to

generate the sixteen-color displays that illustrate this article. I don't claim that they represent the ultimate in Hi-Res graphics programming, but they may have a feature or two worth examining.

For example, the line-drawing subroutine draws smoother lines than the standard Hi-Res HPLLOT routine. HPLLOT is very simple and hence very compact, but it draws too many dots in diagonal lines. My routine (starting at label DHLIN in the listing) draws diagonals with a preferred direction to avoid drawing the extra dots. The method is called Bresenham's Line Algorithm, and you can find it in the standard references for computer graphics listed in the bibliography.

One detail you might find puzzling is the add-immediate (ADC #3) at the beginning of the subroutine labelled DHSPN. The primary job of this subroutine is shifting the color pattern to one of four possible arrangements, depending on the low-order bits of the byte address. If it just uses patterns derived directly from the color values, the subroutine draws colors that do not match the colors you get in Lo-Res. By adding 3 (modulo 4) to the number of times to shift the patterns, the subroutine makes the colors match their Lo-Res counterparts.

How to Select the Double Hi-Res Display

To write your own routines, you'll need to know how to control the double Hi-Res display and how to use the display buffers in the auxiliary memory. The descriptions that follow are based on the information in two Apple manuals:

- Apple //e Reference Manual
- Apple //e Extended 80-Column Text Card Supplement

To switch display modes on the Apple //e, you read or write to the soft switches: reserved addresses in the I/O space (the \$C000 memory addresses). The next few paragraphs tell how to set the switches for double Hi-Res, as listed in Table 3.

Normally, you select Hi-Res graphics by setting the TEXT, MIXED, and PAGE2 soft switches off, and setting the HIRRES soft switch on (or else you invoke an initialization routine, such as HGR in Applesoft, that does this for you). To select the double Hi-Res display, you also have to turn on a new soft switch named 80COL and turn off Annunciator 3. (Note: The double Hi-Res subroutines listed below set the appropriate soft switches when your program issues the & DG statement.)

The soft switch that selects the 80-column display mode on the Apple //e is named 80COL. The addresses for this soft switch are:

80COL on: 49165 (\$C00D)

80COL off: 49164 (\$C00C)

As with most of the soft switches that are new with the Apple //e, you turn these switches on and off only by writing. (If you read these addresses, you get the keyboard data and strobe and there is no effect on the display.)

Even when you have installed all of the necessary hardware and set all of the soft switches for the double Hi-Res display, you still need a way to override the circuit (described in the sidebar about the hardware) that forces normal graphics modes with 80-column text. Unfortunately, with all the other new features on the Apple //e, the soft-switch addresses are all used for something. None is available for turning off the graphics normalizing circuit.

```

100 REM 16-Color Demo #2:
      3-D Cubes

110 PRINT CHR$(13); CHR$(4); "
      BRUN NEW SUBS"

120 REM Draw background lines
130 & DG: & HUE = 15: & PEN
140 FOR X = 1 TO 560 STEP 40
150 : & DOT AT X,0
160 : & LINE TO X,191
170 NEXT
180 & BRUSH
190 REM Draw 5 rows...
200 FOR XZ = 0 TO 4
210 : REM ... 4 cubes in row
220 : FOR YZ = 0 TO 3
230 :: REM Position of cube:
240 :: LET XO = XZ * 80 + YZ * 40

250 :: LET YO = 20 + YZ * 40
260 :: READ C,D,E: REM Colors
270 :: IF C < 99 THEN 300
280 :: RESTORE : READ C,D,E
290 :: REM Left part of cube:
300 :: FOR I = 0 TO 9
310 :: LET J = I + I:K = J + J
320 :: LET X = XO + K:Y = YO - I

330 :: & HUE = C
340 :: & DOT AT X,Y
350 :: & LINE TO X,Y + J
360 :: & HUE = D
370 :: & LINE TO X,Y + J + 30
380 :: NEXT
390 :: LET XO = XO + 40
400 :: REM Right part of cube:
410 :: FOR I = 0 TO 9
420 :: LET J = I + I:K = J + J
430 :: LET J = 20 - J
440 :: LET X = XO + K
450 :: LET Y = YO - 10 + I
460 :: & HUE = C
470 :: & DOT AT X,Y
480 :: & LINE TO X,Y + J
490 :: & HUE = E
500 :: & DOT AT X,Y + J
510 :: & LINE TO X,Y + J + 30
520 :: NEXT
530 :: REM End of outer loops
540 NEXT : NEXT
550 END

10000 REM Color values
10010 DATA 7,6,2,13,9,8,11,3,1,1
      4,12,4
10020 DATA 11,3,1,14,12,4,7,6,2,
      13,9,8
10030 DATA 99,99,99

```

Listing 3

Switch Function:	Address:	
	Decimal	Hexadecimal
TEXT off:	49232	\$C050
MIXED off:	49234	\$C052
PAGE2 off:	49236	\$C054
HIRES on:	49239	\$C057
80COL on:	49165*	\$C00D *
Annunciator 3 off:	49246	\$C05E

Table 3. Soft switch settings for the double Hi-Res graphics display.

* Note: You must write to this address, rather than read, to set this soft switch.

Switch Function:	Address:	
	Decimal	Hexadecimal
HIRES on:	49239	\$C057
80STORE on:	49153 *	\$C001 *
Access Auxiliary Display		
Memory (PAGE2 on):	49237	\$C055
Access Main Display		
Memory (PAGE2 off):	49236	\$C054

Table 4. Soft switch settings for writing to the double Hi-Res graphics pages.

* Note: You must write to this address, rather than read, to turn on the soft switch.

In place of a soft switch, the jumper on the extended 80-column card connects the normalizing circuit to Annunciator 3, which is normally on, having been set when you turned on or reset the Apple //e. To disconnect the normalizing circuit, thereby enabling the double graphics mode, you turn Annunciator 3 off by reading or writing to address 49246 (\$C05E). To restore the normal graphics modes with 80-character text, you turn Annunciator 3 back on by reading or writing to address 49247 (\$C05F).

How to Store Data in the Double Hi-Res Display

To store data into the double Hi-Res display, you write to parts of main and auxiliary memory that are addressed in the same way but accessed separately. The Apple //e Reference Manual describes two different ways to write to the auxiliary memory. Table 4 lists the soft switches for the recommended method of writing to the display pages.

The soft switch that makes it possible to write to the auxiliary display pages is named 80STORE. The addresses for 80STORE are:

80STORE on: 49153 (\$C001)
80STORE off: 49152 (\$C000)

As with the 80COL soft switch, you turn these switches on and off only by writing.

Turning on 80STORE redefines the function of the PAGE2 switch. Instead of switching the display from Page 1 to Page 2, it now switches the display memory for reading and writing from main to auxiliary. (Like the use of Annunciator 3, this double use of the PAGE2 soft switch is due to the shortage of soft-switch addresses.) With the 80STORE switch on, changing the PAGE2 switch does not affect the display; the //e continues to display Page 1.

To write to the auxiliary Hi-Res display page, you also need to have the HIRES soft switch on. If you forget to set the HIRES switch on, the PAGE2 switch will affect only the addresses in the text display page and your attempts to write into the Hi-Res page in auxiliary memory will write into main memory instead.

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Listing 1

```

SOURCE      0000:  FILE: NEW SUBS PLAIN
0000:  1 *****
0000:  2 ** Double Hi-res Subs **
0000:  3 ** Double Hi-res Subs **
0000:  4 **
0000:  5 ** Version 1.4 7/25/83 **
0000:  6 **
0000:  7 ** Allen Watson III **
0000:  8 **
0000:  9 *****
0000:  10 **
0000:  11 ** Soft-switch Equates
0000:  12 **
0000:  13 TXTCUR EQU $C050  Grafix on
0000:  14 MIXSET EQU $C053  Mixed text with grafix
0000:  15 MIXSET EQU $C053  No text with grafix
0000:  16 HIRSES EQU $C057  Hi-res on
0000:  17 LORES EQU $C056  Hi-res off
0000:  18 PAGE2 EQU $C055  Page2 on
0000:  19 PAGE2 EQU $C055  Page2 off
0000:  20 MAINPAGE EQU $C054  Page2 for aux.
0000:  21 READPAGE EQU $C01C $80 = aux page
0000:  22 WBOCOL EQU $C00D  Write for dubl display
0000:  23 WBOOFF EQU $C00C  Write for single display
0000:  24 WBOSTORE EQU $C001  Write for dubl store
0000:  25 RAMRDFF EQU $C002  48K RAM read off
0000:  26 RAMWTOFF EQU $C004  48K RAM write off
0000:  27 AN3 EQU $C05E  Enables dubl hi-res hdw.
0000:  28 AN3OFF EQU $C05F  For lo-res display
0000:  29 VBL EQU $C019  Vertical blanking
0000:  30 *
0000:  31 * Variable equates
0000:  32 *
0000:  33 AUXFLAG EQU $19
0000:  34 HCOLR1 EQU $1C
0000:  35 HNDX EQU $1E
0000:  36 HBASL EQU $26
0000:  37 HBASH EQU $27
0000:  38 XOL EQU $E0
0000:  39 XOH EQU $E1
0000:  40 YO EQU $E2
0000:  41 HCOLOR EQU $E4
0000:  42 HPAG EQU $E6
0000:  43 HDFLAG EQU $EB
0000:  44 HDIR EQU $EC
0000:  45 HWDI EQU $ED
0000:  46 HMASK EQU $EE
0000:  47 HMASKE EQU $EF
0000:  48 COUNTH EQU $F9
0000:  49 DL EQU $FA
0000:  50 DH EQU $FB
0000:  51 DXL EQU $FC
0000:  52 DXH EQU $FD
0000:  53 DYL EQU $FE
0000:  54 DYH EQU $FF
0000:  55 *
0000:  56 *
0000:  57 * Applesoft equates
0000:  58 *
0000:  59 TXTPTR EQU $B8  Applesoft cmd pointer
0000:  60 AMPRHK EQU $3F5  Ampersand hook
0000:  61 ADLISP EQU $D928  Fixup line pointer
0000:  62 FRMEVL EQU $DD67  Formula evaluator
0000:  63 SYNCNR EQU $DE0C  Fixup command pointer
0000:  64 PRTERB EQU $DEC9  Print syntax-error message
0000:  65 GETBYT EQU $E6F8  Return parm in X-reg
0000:  66 GETADR EQU $E752  Get 2-byte value in $50, $51

0000:  67 ILLQTY EQU $F6E6  Print illegal-quantity message
0000:  68 *
0000:  69 *****
0000:  70 *
0000:  71 * Program starts at $6000
0000:  72 *
0000:  73 NAME IS NEW SUBS PLAIN.OBJO
0000:  74 ORG $6000
0000:  75 * Set Ampersand hook address
0000:  76 *
0000:  77 LDA #>PARSR
0000:  78 STA AMPRHK+1
0000:  79 LDA #<PARSR
0000:  80 STA AMPRHK+2
0000:  81 RTS
0000:  82 *
0000:  83 *****
0000:  84 * Parameter subroutine
0000:  85 *
0000:  86 *
0000:  87 *
0000:  88 DHFNS JSR FRMEVL get parm value
0000:  89 JSR GETADR into $50, $51
0000:  90 *
0000:  91 LDY $51
0000:  92 LDY $50
0000:  93 *
0000:  94 CPY #02
0000:  95 BCC DHFN1 it's low enough
0000:  96 DNE TOOBIG
0000:  97 CPX #30 Still low enough?
0000:  98 BCS TOOBIG nope
0000:  99 *
0000:  100 DHFN1 STX DL temp save
0000:  101 STY DH
0000:  102 *
0000:  103 LDA #2C (comma, for SYNCHR)
0000:  104 JSR SYNCHR Move on to...
0000:  105 JSR GETBYT ...next parm
0000:  106 *
0000:  107 CPX #C0
0000:  108 BCS TOOBIG (oops!)
0000:  109 *
0000:  110 TXA YO IN A-reg,
0000:  111 XOL DL XOL in X-reg, &
0000:  112 LDY DH XOH in Y-reg.
0000:  113 RTS
0000:  114 *
0000:  115 *
0000:  116 TOOBIG JMP ILLQTY Applesoft err msg.
0000:  117 *
0000:  118 *
0000:  119 *****
0000:  120 * Ampersand command parser
0000:  121 *
0000:  122 *
0000:  123 PARSR LDY #0
0000:  124 STX CMDNUM
0000:  125 PARSR1 LDY #0
0000:  126 PARSR2 LDA CMDTBL, X
0000:  127 BEQ CMDFND
0000:  128 CMP #FFF End of table?
0000:  129 BEQ ERRMSG No match -> err
0000:  130 CMP (TXTPTR), Y Char. in line
0000:  131 BNE PARSR3 no match; -> next cmd
0000:  132 INY
0000:  133 INX
0000:  134 BNE PARSR2 always taken
0000:  135 ERRMSG JMP PRTERB Print syntax err
0000:  136 *

```




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Address	Hex	Assembly	Comments
6053:EB	137	PARSR3	INX
6054:BD 72 60	138	LDA CMDTBL,X	Char from table
6057:0E FA 6053	139	BNE PARSR3	(O-end this cmd.)
6059:EB	140	INC CMDNUM	Start of next cmd.
605A:EE 71 60	141	INC CMDNUM	
605D:0E DE 603D	142	BNE PARSR1	always taken
605F:	143	*	
606F: 20 9B D9	144	CMDFND	JSR ADDRISP
6062:0E 71 60	145	ASL CMDNUM	dubl for 2-byte addr
6065:AE 71 60	146	LDX CMDNUM	
6068:BD 9D 60	147	LDA ADDTBL+1,X	(Hack for
606B:4B	148	PHA	JSR to addr
606C:BD 9C 60	149	LDA ADDTBL,X	
606F:4B	150	PHA	
6070:60	151	RTS	-> to addr on stack!
6071:	152	*	
6071:	153	*****	
6071:	154	*	
6071:	155	Local data for Parser	
6071:	156	*	
0001	157	CMDFND DS 1	local data
6072:	158	MSB OFF	
6072:	159	*	
6072:	160	*	
6072:	161	CMDTBL	EGU *
6072: 44 47	162	ASC "DG"	uses DHINIT
6074:00	163	DFB 0	
6075:47 4D 4F 44	164	ASC "GCODE"	uses DHINIT
607A:00	165	DFB 0	
607B:48 55 45	166	ASC "HUE"	uses DHCCLR
607E:00	167	DFB \$D0	"="
607F:00	168	DFB 0	
6080:44 4F 54	169	ASC "DOT"	uses DHPLT
6083:C5	170	DFB \$C5	"AT"
6084:00	171	DFB 0	
6085:4C 49 4E 45	172	ASC "LINE"	uses DHLIN
6089:C1	173	DFB \$C1	"TO"
608A:00	174	DFB 0	
608B:50 45 4E	175	ASC "PEN"	uses DHPEN
608E:00	176	DFB 0	
608F:42 52 55 53	177	ASC "BRUSH"	uses DHBRUSH
6094:00	178	DFB 0	
6095:42 4B 47 4E	179	ASC "BKGN"	uses DHBKG
609A:00	180	DFB 0	
609B:FF	181	DFB \$FF	End of table
609C:	182	*	
609C:	183	ADDTBL	EGU *
609C: AB 60	184	DW DHINIT-1 & DG	
609E: AB 60	185	DW DHINIT-1 & GMODE	
60A0: 1A 61	186	DW DHCCLR-1 & HUE =	
60A2: C9 61	187	DW DHPLT-1 & DOT AT	
60A4: F4 62	188	DW DHLIN-1 & LINE TO	
60A6: 42 61	189	DW DHPEN-1 & PEN	
60A8: 47 61	190	DW DHBRUSH-1 & BRUSH	
60AA: CB 60	191	DW DHBKG-1 & BKGN	
60AC:	192	*	
60AC:	193	*	
60AC:	194	*****	
60AC:	195	*	
60AC:	196	Dubl Hi-res Initialization	
60AC:	197	*	
60AC: A9 20	198	DHINIT	LDA #\$20
60AC: 85 E6	199	*	Init \$2000-\$3FFF
60AE:	200	*	
60AE:	201	STA HPAG	
60B0:	202	*	
60B0: AD 57 C0	203	LDA HIRES	Hi-res on
60B3: AD 52 C0	204	LDA NOTEXT	Graphic on
60B6: AD 50 C0	205	LDA TXTCLR	No mixed
60B9: AD 02 C0	206	LDA RAMRDFFF	Read main mem
60BC: AD 04 C0	207	LDA RAMWTOFF	Write main mem
60BF: BD 01 C0	208	STA WBOSTORE	Store in both
60C3:BD 0D C0	209	STA WBOCOL	Dubl display
6055:AD 5E C0	210	LDA AN3	Enable hndw.
60C8:	211	*	fall thru into Clear...
60C8:	212	*	
60C8:	213	*****	
60C8:	214	*	
60C8:	215	Dubl Hi-res Clear	
60C8:	216	*	
60C8: A9 00	217	DHCLR	LDA #0
60CA: F0 02	218	BEG DHBKGO	always taken
60CC:	219	*	
60CC:	220	*****	
60CC:	221	*	
60CC:	222	Dubl Hi-res Background	
60CC:	223	*	
60CC: A5 E4	224	DHBKG	LDA HCOLOR
60CE: B5 1C	225	DHBKGO	STA HCOLOR1
60D0: A5 E6	226	DHBKG1	LDA HPAG
60D2: B5 FB	227	STA DH	Index hi-res
60D4: A0 00	228	LDY #0	page using
60D6: 84 FA	229	STY DL	DL, DH
60D8:	230	*	
60D8: A5 1C	231	LDA HCOLOR1	
60DA: B5 FC	232	STA DXL	Set up color bytes
60DC: A2 01	233	LDX #1	
60DE: 0A	234	DHBKG2	ASL A
60DF: 69 00	235	ADC #0	(prop. carry bit)
60E1: 95 FC	236	STA DXL,X	for fast filling
60E3: E8	237	INX	
60E4: E0 04	238	CPX #4	

6122:85 E8	279 *	STA HFLAG	6172:85 27	350 *	STA HBASH	
6124:	280 *	TXA	6174:	351 *	Horizontal position	
6125:10 07	281	BPL DHCOLR1	6174:	352 *		
6127:A5 E8	282	LDA HFLAG	6174:8A	353 *	TXA	X-lo to acc.
6129:09 40	283	LDA HFLAG	6175:00 00	354	CPY #0	Test X-hi:
612B:85 E8	284	ORA HFLAG	6177:F0 16	355	BEG DHPSN2	
612D:8A	285	TXA	6179:00 01	356	CPY #1	
612E:	286 *		617B:F0 06	357	BEG OLDHP	
612E:29 0F	287	DHCOLR1 AND #0F	617D:A0 48	358	LDY #48	X-hi = 2
6130:85 E4	288	STA HCOLOR	617F:69 00	359	ADC #0	(rem mod 7)
6132:0A	289	ASL A	6181:90 0A	360	BCC DHPSNO	always taken
6133:0A	290	ASL A	6183:	361 *	LDY #23	X-hi = 1
6134:0A	291	ASL A	6183:A0 23	362 *	ADC #3	(rem mod 7)
6135:0A	292	ASL A	6185:69 03	363	BCC DHPSNO	
6136:05 E4	293	STA HCOLOR	6187:90 04	364	LDY #47	
6138:85 E4	294	STA HCOLOR	6189:A0 47	365	ADC #3	
613A:	295 *		618B:69 03	366		
613A:	296 *	Spin color for column	618D:	367 *		
613A:	297 *	LDA AUXFLAG	618D:38	368 *	SEC	
613A:A5 19	298	ASL A	618E:C8	369	DHPSNO	
613C:0A	299	LDA HNDX	618F:E9 07	370	DHPSN1	Divide by 7
613D:A5 1E	300	ROL A	6191:80 FB	371	SBC #7	
613F:2A	301	JMP DHSPN	6193:	372 *	BCS DHPSN1	
6140:4C B7 61	302		6193:84 1E	373 *	STY HNDX	
6143:	303 *		6195:46 1E	374	LSR HNDX	byte offset
6143:	304 *		6197:66 19	375	ROR AUXFLAG	neg = aux, pos = main
6143:	305 *		6199:	376 *	TAX	For mask select
6143:	306 *****		6199:AA	377 *		
6143:	307 *	Set mask width	619A:	378 *	Shift color byte	
6143:	308 *	DHPEN -> 1-bit mask	619A:	379 *	TYA	(still YO/7)
6143:	309 *	DHBRUSH -> 4-bit mask	619A:98	380 *	JSR DHSPN	Spin color for column
6143:	310 *		619B:	381 *		
6143:	311 *		619B:20 B7 61	382 *		
6143:	312 *		619E:	383 *	Which mask table?	
6143:	313	DHPEN LDA #00 (7) off	619E:	384 *		
6143:A9 00	314	STA HWIDE	619E:	385 *		
6145:85 ED	315	RTS	619E:	386 *		
6147:60	316 *		619E:	387 *		
6148:	317	DHBRUSH LDA #80 (7) on	619E:24 ED	388	BIT HWIDE	
6148:A9 80	318	STA HWIDE	61A0:30 0A	389	BMI DHPMK4	Use 4-bit mask
614A:85 ED	319	RTS	61A2:	390 *	LDA MSKTB1-249, X	
614C:60	320 *		61A2:BD 2E 63	391	STA HMASK	
614D:	321 *****		61A5:85 EE	392	LDA #0	
614D:	322 *	Dubl Hi-res Position	61A7:A9 00	393	STA HMASKE	
614D:	323 *		61A9:85 EF	394		
614D:	324 *		61AB:	395 *		
614D:85 E2	325	DHPSN STA YO	61AB:60	396	RTS	
614F:86 E0	326	STX XOL	61AC:	397 *	LDA MSKTB4-249, X	
6151:84 E1	327	STY XOH	61AC:BD 35 63	398	DHPMK4	
6153:	328 *	Vertical base calc.	61AF:85 EE	399	STA HMASK	
6153:	329 *		61B1:8D 3C 63	400	LDA MSKTB5-249, X	
6153:	330 *		61B4:85 EF	401	STA HMASKE	Extens. byte
6153:	331	STA HBASH	61B6:	402 *		
6155:29 C0	332	AND #C0	61B6:60	403	RTS	
6157:85 26	333	STA HBASH	61B7:	404 *		
6159:4A	334	LSR A	61B7:	405 *	Spin color byte for column	
615A:4A	335	LSR A	61B7:	406 *		
615B:05 26	336	ORA HBASH	61B7:	407 *		
615D:85 26	337	STA HBASH	61B7:18	408	DHSPN	(added color shift to
615F:A5 27	338	LDA HBASH	61B8:69 03	409	ADC #3	make 'em like lo-res)
6161:0A	339	ASL A	61BA:29 03	410	AND #03	
6162:0A	340	ASL A	61BC:AB	411	TAY	How many shifts, mod 3
6163:0A	341	ROL HBASH	61BD:	412 *		
6164:26 27	342	ASL A	61BD:A5 E4	413	LDA HCOLOR	
6166:0A	343	ASL A	61BF:85 1C	414	STA HCOLOR1	
6167:26 27	344	ROL HBASH	61C1:88	415	DEV	
6169:0A	345	ASL A	61C2:30 05	416	BMI DHSPN2	
616A:66 26	346	ROR HBASH	61C4:0A	417	ASL A	
616C:A5 27	347	LDA HBASH	61C5:69 00	418	ADC #0	
616E:29 1F	348	AND #1F	61C7:90 F6	419	BCC DHSPN1	always taken
6170:05 E6	349	ORA HPAG	61C9:60	420	DHSPN2	


```

61CA: 421 * *****
61CA: 422 * *****
61CA: 423 * Dubl Hi-res Plot
61CA: 424 *
61CA: 425 *
61CA: 426 DHPLOT JSR DHFNS Get parms in A,X,Y-regs
61CA: 427 *
61CA: 428 DHPLOT JSR DHPSN
61CA: 429 *
61CA: 430 LDA HNDX Test for out
61CA: 431 CMP #28 of bounds.
61CA: 432 BCC DHPLOT1
61CA: 433 *
61CA: 434 RTS Out of bounds
61CA: 435 *
61CA: 436 DHPLOT1 BIT AUXFLAG Aux or main?
61CA: 437 BMI DHPLOT2
61CA: 438 STA AUXPAGE
61CA: 439 BPL DHPLOT2
61CA: 440 DHPLOT STA MAINPAGE
61CA: 441 *
61CA: 442 DHPLOT2 LDY HNDX Byte offset
61CA: 443 LDA HMASK
61CA: 444 BIT HFLAG
61CA: 445 BVS DXPL1 Go EOR it.
61CA: 446 *
61CA: 447 LDA HCOLOR1
61CA: 448 EOR (HBASEL),Y
61CA: 449 AND HMASK
61CA: 450 DXPL1 EOR (HBASEL),Y Set and...
61CA: 451 BIF3 91 26 STA (HBASEL),Y store dot
61CA: 452 *
61CA: 453 BIT HWIDE If wide mask,
61CA: 454 BMI DHPLOT3 go plot more
61CA: 455 *
61CA: 456 RTS
61CA: 457 *
61CA: 458 DHPLOT3 BIT AUXFLAG Aux or main?
61CA: 459 BMI DHPLOT4 Set for other:
61CA: 460 STA MAINPAGE
61CA: 461 BPL DHPLOT4
61CA: 462 DHPLOT4 STA AUXPAGE
61CA: 463 *
61CA: 464 INY Next column pair
61CA: 465 CPY #28 Past right edge?
61CA: 466 BCC DHPLOT4
61CA: 467 LDY #0 wrap to left edge
61CA: 468 *
61CA: 469 DHPLOT4 LDA HMASKE
61CA: 470 BIT HFLAG
61CA: 471 BVS DXP2 Go EOR it.
61CA: 472 *
61CA: 473 LDA HCOLOR1
61CA: 474 ASL A Shift color for
61CA: 475 ADC #0 next column right
61CA: 476 EOR (HBASEL),Y
61CA: 477 AND HMASKE extension mask
61CA: 478 DXP2 EOR (HBASEL),Y Set and
61CA: 479 STA (HBASEL),Y store dot
61CA: 480 *
61CA: 481 RTS
61CA: 482 *
61CA: 483 *
61CA: 484 *****
61CA: 485 * Move up (new base address)
61CA: 486 *
61CA: 487 *
61CA: 488 UP CLC
61CA: 489 LDA HBASH
61CA: 490 BIT EQ1C
61CA: 491 BNE UP5 Not end bank

```

```

492 ASL HBASH
493 BCS UP3 Not top row
494 BIT EQ3
495 BEQ UP1
496 ADC #1F
497 SEC
498 BCS UP4
499 *
500 UP1
501 ADC #23
502 STA HBASH
503 LDA HBASH
504 ADC #80
505 BCS UP2
506 UP2
507 STA HBASH
508 LDA HBASH
509 BCS UP4 always taken
510 UP3
511 UP4
512 UP5
513 STA HBASH
514 RTS
515 *
516 *****
517 * Move down (new base address)
518 *
519 *
520 DOWN CLC
521 DOWN LDA HBASH
522 ADC #4
523 BIT EQ1C
524 BNE DOWN4 Not end bank
525 *
526 ASL HBASH
527 BCC DOWN2 Not bottom row
528 *
529 ADC #EO
530 CLC
531 BIT EQ4
532 BEQ DOWN3
533 *
534 LDA HBASH
535 ADC #50
536 EOR #FO
537 BEQ DOWN1
538 EOR #FO
539 DOWN1
540 STA HBASH
541 LDA HPAG
542 BCC DOWN3
543 DOWN3
544 DOWN4
545 STA HBASH
546 RTS
547 *****
548 * Move left (new mask)
549 *
550 *
551 LEFT LDY HNDX
552 *
553 BIT HWIDE Which mask width?
554 BPL LMSK1 1-bit masks
555 *
556 LDA HMASK 4-bit masks
557 BIT EQFO Is it left-most?
558 BEQ LEFT1 yes
559 ASL A Throw away sign bit,
560 LSR HMASKE shift both masks
561 ROR A
562 LSR A

```



```

6291:85 EE 563 LR1 STA HMASK 62E9:85 EE 634 RIGHT4 STA HMASK
6293:60 564 RTS 62EB:84 1E 635 STY HNDX
6294: 565 * 636 * Color shift for next column right
6294:A5 EE 566 LMSK1 LDA HMASK 62ED: 637 *
6296:4A 567 LSR A 62ED: 638 *
6297:D0 F8 6291 BNE LR1 Mask still OK 639 CRSHFT LDA HCOLOR1
6299: 568 * 62EF:0A 640 ASL A Prop. carry bit
6299: 569 * Next column to left 62F0:89 00 641 ADC #0
6299: 570 * 62F2:85 1C 642 STA HCOLOR1
6299: 571 * 62F4: 643 * RTS
6299:24 19 572 LEFT1 BIT AUXFLAG 62F5: 644 *****
629B:10 04 573 BPL LEFT2 Aux: need new index 62F5: 645 *
629D:46 19 574 LSR AUXFLAG flag -> aux 62F5: 646 *
629F:10 08 575 BPL LEFT4 always taken 62F5: 647 *
62A1:38 576 LEFT2 SEC 62F5: 648 *
62A2:66 19 577 ROR AUXFLAG flag -> main 62F5: 649 *
62A4: 578 * 62F5: 650 *
62A4:88 579 LEFT3 DEY New index value 62F5: 651 *
62A5:10 02 580 BPL LEFT4 62F5: 652 *
62A7:A0 27 581 LDY #27 Wrap 1. to r. edge 62F5: 653 *
62A9:A9 07 582 LEFT4 LDA #07 New masks for 62F5: 654 *
62AB:85 EF 583 STA HMASKE right edge 62F5: 655 *
62AD:A9 40 584 LDA #40 62F5:20 0B 60 656 *
62AF:85 EE 585 STA HMASK 62F8:85 FA 657 *
62B1:84 1E 586 STY HNDX 62FA: 658 *
62B3: 587 * Color shift for next column left 62FA:8A 659 *
62B3: 588 * 62FB:38 660 *
62B3: 589 * 62FC:E5 E0 661 *
62B3:A5 1C 590 CLSHFT LDA HCOLOR1 62FE:85 FC 662 *
62B5:4A 591 LSR A Shift color byte... 6300:98 663 *
62B6:90 02 592 BCC CLSHFT1 6301:E5 E1 664 *
62B8:09 80 593 ORA #80 prop. carry bit 6303:85 FD 665 *
62BA:85 1C 594 CLSHFT1 STA HCOLOR1 6305:85 EC 666 *
62BC: 595 * 6307:B0 0D 6316 667 *
62BC:60 596 * 6309: 668 *
62BD: 597 * 6309:38 669 *
62BD: 598 * 630A:A7 00 670 *
62BD: 599 * Move right (new mask) 630C:E5 FC 671 *
62BD: 600 * 630E:85 FC 672 *
62BD: 601 * 6310:A9 00 673 *
62BD:A4 1E 602 RIGHT LDY HNDX 6312:E5 FD 674 *
62BF: 603 * 6314:85 FD 675 *
62BF:A5 EE 604 LDA HMASK 6316: 676 *
62C1:0A 605 ASL A Shift past sign 6316:A5 FA 677 *
62C2:0A 606 ROL HMASKE for exten byte 6318:38 678 *
62C3:26 EF 607 LSR A undo extra shift 6319:E5 E2 679 *
62C5:4A 608 BCC RMSK 631B:85 FE 680 *
62C6:F0 03 609 STA HMASK Shift is OK 631D:A9 00 681 *
62C8:85 EE 610 RTS 631F:85 FF 682 *
62CA:60 611 * 6321:B0 06 683 *
62CB: 612 * 6323:38 684 *
62CB:85 EF 613 RMSK STA HMASKE 0 -> exten byte 6324:E5 FE 685 *
62CD: 614 * 6326:85 FE 686 *
62CD:24 ED 615 BIT HWIDE Which mask width? 6328:18 687 *
62CF:10 04 616 BPL RMSK1 1-bit masks 6329:66 EC 688 *
62D1:A9 0F 617 LDA #0F New left mask 632B: 689 *
62D3:D0 02 618 BNE RIGHT1 always taken 632B:A5 FA 690 *
62D5:A9 01 619 RMSK1 LDA #01 New left mask 632D:85 E2 691 *
62D7: 620 * 632F:86 E0 692 *
62D7: 621 * Next column right 6331:84 E1 693 *
62D7: 622 * 6333: 694 *
62D7:24 19 623 RIGHT1 BIT AUXFLAG 6333: 695 *
62D9:30 05 624 BMI RIGHT2 6333: 696 *
62DB:38 625 SEC 6333: 697 *
62DC:66 19 626 ROR AUXFLAG flag -> main 6333:A5 FD 698 *
62DE:30 09 627 BMI RIGHT4 always taken 6337:A5 FC 699 *
62E0: 628 * 6339:D0 05 6340 *
62E0:46 19 629 RIGHT2 LSR AUXFLAG flag -> aux 633B:C5 FE 701 *
62E2:C8 630 RIGHT3 INY Next column 633D:D0 01 6340 *
62E3:C0 28 631 CPY #28 633F: 702 *
62E5:90 02 632 BCC RIGHT4 633F:60 703 *
62E7:A0 00 633 * 633F:60 704 *

```

DX=0 and DY=0 -> NOP!


```

6340: C5 FE      705 *      DHALING CMP DYL      777 *      INX
6341: B0 6F      706 *      BCS XMAIN  DX > DY      778 *      BNE YMOVE
6342:          707 *      63B3          779 *      INC COUNTH
6343:          708 *      634E          780 *      BNE YMOVE
6344:          709 *      *****
6345:          710 *      Y is main direction      781 *      RTS
6346:          711 *      63B2: 60      782 *      -> EXIT
6347:          712 *      63B3:          783 *      *****
6348:          713 *      YMAIN SEC      784 *      *****
6349:          714 *      LDA #0      785 *      *****
6350:          715 *      SBC DYL      786 *      *****
6351:          716 *      TAX      787 *      *****
6352:          717 *      LDA #0      788 *      X is main direction
6353:          718 *      SBC #0      789 *      *****
6354:          719 *      STA COUNTH      790 *      XMAIN SEC
6355:          720 *      6350:          791 *      LDA #0
6356:          721 *      ASL DYL      792 *      SBC DXL
6357:          722 *      ROL DXH      793 *      TAX
6358:          723 *      6352: 26 FD      794 *      LDA #0
6359:          724 *      SEC      795 *      SBC DXH
6360:          725 *      LDA DYL      796 *      STA COUNTH
6361:          726 *      SBC DYL      797 *      ASL DYL
6362:          727 *      STA DL      798 *      ROL DYH
6363:          728 *      LDA DXH      799 *      63C1: 26 FF
6364:          729 *      SBC #0      800 *      SEC
6365:          730 *      STA DH      801 *      LDA DYL
6366:          731 *      6361:          802 *      SBC DXL
6367:          732 *      LDA DL      803 *      STA DL
6368:          733 *      SBC DYL      804 *      LDA DYH
6369:          734 *      STA DYL      805 *      SBC DXH
6370:          735 *      LDA DH      806 *      STA DH
6371:          736 *      SBC #0      807 *      D = 2*DY - DX
6372:          737 *      STA DYH      808 *      SEC
6373:          738 *      636C: 85 FF      809 *      LDA DL
6374:          739 *      Y Line Loop: do until COUNT -> 0      810 *      SBC DXL
6375:          740 *      636E:          811 *      STA DXL
6376:          741 *      YMOVE BIT HDIR      812 *      LDA DH
6377:          742 *      BMI YDOWN      813 *      SBC DXH
6378:          743 *      6377:          814 *      STA DXH
6379:          744 *      6372: 20 21 62      815 *      DX = 2*DY - 2*DX (D2)
6380:          745 *      6375: 20 03 637A      816 *      63DD:
6381:          746 *      6377: 20 52 62      817 *      X Line Loop: do until COUNT -> 0
6382:          747 *      637A:          818 *      63DD:
6383:          748 *      YDOWN JSR DOWN      819 *      XMOVE BIT HDIR
6384:          749 *      637A:          820 *      BVC XRIGHT
6385:          750 *      BUMPY BPL      821 *      JSR LEFT
6386:          751 *      63BE          822 *      JMP BUMPX
6387:          752 *      637E: 18      823 *      Move plot point left
6388:          753 *      637F: A5 FA      824 *      63E7: 20 BD 62
6389:          754 *      6381: 65 FC      825 *      XRIGHT JSR RIGHT
6390:          755 *      6383: 85 FA      826 *      63E7: 20 BD 62
6391:          756 *      6385: A5 FB      827 *      BUMPX BPL DH
6392:          757 *      6387: 65 FD      828 *      CLC
6393:          758 *      6389: 85 FB      829 *      LDA DL
6394:          759 *      638B: 4C AB 63      830 *      ADC DYL
6395:          760 *      63BE: 18      831 *      STA DL
6396:          761 *      63BF: A5 FA      832 *      LDA DH
6397:          762 *      6391: 65 FE      833 *      ADC DYH
6398:          763 *      6393: 85 FA      834 *      STA DH
6399:          764 *      6395: A5 FB      835 *      JMP XDRAW
6400:          765 *      6397: 65 FF      836 *      63FE:
6401:          766 *      6399: 85 FB      837 *      63FE: 18
6402:          767 *      639B:          838 *      BUMPX CLC
6403:          768 *      639D: 24 EC      839 *      LDA DL
6404:          769 *      639F: 50 06 63A5      840 *      ADC DXL
6405:          770 *      63A1: 20 7F 62      841 *      STA DL
6406:          771 *      63A3:          842 *      LDA DH
6407:          772 *      63A5:          843 *      ADC DXH
6408:          773 *      63A7:          844 *      STA DH
6409:          774 *      63A9:          845 *      BIT HDIR
6410:          775 *      63AB:          846 *      BMI XDOWN
6411:          776 *      63AD: 20 D7 61      847 *      (7)=down

```



```

640F: 20 21 62      848: XUP      JSR UP      Move plot point up
6412: 4C 1B 64      849 *      JMP XDRAW
6415:                850 *
6415: 20 52 62      851 XDOWN      JSR DOWN      Move plot point down
6418:                852 *
6418: 20 D7 61      853 XDRAW      JSR DHPLT1
641B:                854 *
641B: EB          855 INX
641C: DO BF        856 BNE XMOVE
641E: E6 F9        857 INC COUNTH
6420: DO BB        858 BNE XMOVE
6422:                859 *
6422: 60          860 RTS
6423:                861 *
6423:                862 *
6423:                863 *
6423:                864 *
6423:                865 *****
6423:                866 * Local data
6423:                867 *
6423: 03          868 DFB 3
6424: 04          869 EG3
6425: 1C          870 EG4
6426: F0          871 EG1C
6427:                872 EGFO
6427:                873 *
6427:                874 *****
6427:                875 * Bit mask tables
6427:                876 *
6427:                877 * One-bit masks
6427:                878 *
6427:                879 *
6427: 01          880 MSKTB1
6428: 02 04 08      881 DFB $01
6428: 10 20          882 DFB $02, $04, $08
6429: 40          883 DFB $10, $20
6429:                884 * Right-most bit
642E:                885 * Four-bit masks
642E:                886 *
642E:                887 MSKTB4
642E: OF          888 DFB $0F
642F: 1E 3C 78      889 DFB $1E, $3C, $78
6432: 70 60          890 DFB $70, $60
6434: 40          891 *
6435:                892 *
6435:                893 MSKTB5
6435: 00          894 DFB $0
6436: 00 00          895 DFB $0, $0
6439: 01 03          896 DFB $01, $03
643B: 07          897 DFB $07
643C:                898 *
643C:                899 *****
643C:

```

A disk containing all of the listings shown in the True 16 - Color Hi - Res article is now available.



If you would rather not type in all of this yourself, send \$15.00 to:

Apple Orchard
P.O. Box 6502
Cupertino, CA 95015

How the Double Hi-Res Hardware Came To Be

The story of the double Hi-Res display starts with the text display. A normal Apple II displays forty columns of text. Each text character is generated from a byte of ASCII data stored in a 1,024-byte display page (only 960 characters are actually displayed). The computer's display circuits select a new byte of data every microsecond. The character generator decodes the byte and produces a character image in a seven-by-eight-dot rectangle on the display screen. Each line of a character image takes one microsecond to display, so the dots are sent to the display at a rate of seven megahertz (7 MHz).

To display eighty columns of text, the computer must store twice as much display data (2048 bytes), and it must address the data and send dots to the display twice as fast as normal. The video circuit has to get two bytes of data during each microsecond and send the video dots out at double the normal rate; that is, at 14 MHz. The Apple //e performs the trick of getting twice as much video data in the same amount of time by interleaving bytes from auxiliary memory and bytes from main memory.

To see how this works, refer to Figure 1, which is a block diagram of the video memory fetch and display circuits. Start with the address bus, which is connected both to main memory and to auxiliary memory. Both memories get the address at the same time, and the respective video buffers load data at the same time, but the video data bus takes the data from the buffers individually on alternate ticks of the main system clock. (The clock signals are indicated on the diagram as $\phi 0$ and $\phi 1$, where the Greek letter phi stands for phase). Look at Figure 2 to see how the timing in 80-column mode compares with that in 40-column mode.

This approach to the 80-column text option is quite satisfactory, but it raises several interesting questions. For example, what does the Hi-Res display do when you switch to the double dot rate for 80-columns? And what do you see if you switch to 80-column Hi-Res while using an auxiliary card that has memory only in the text display page? As a result of these questions, the designers added a circuit to the Apple //e that makes the graphics modes behave normally even when the eighty-column text option is on. That means you can have mixed-mode displays that combine eighty-column text with normal graphics. It also means that you can't have double Hi-Res without somehow circumventing that circuit; that's the function of the jumper on the extended 80-column text card.

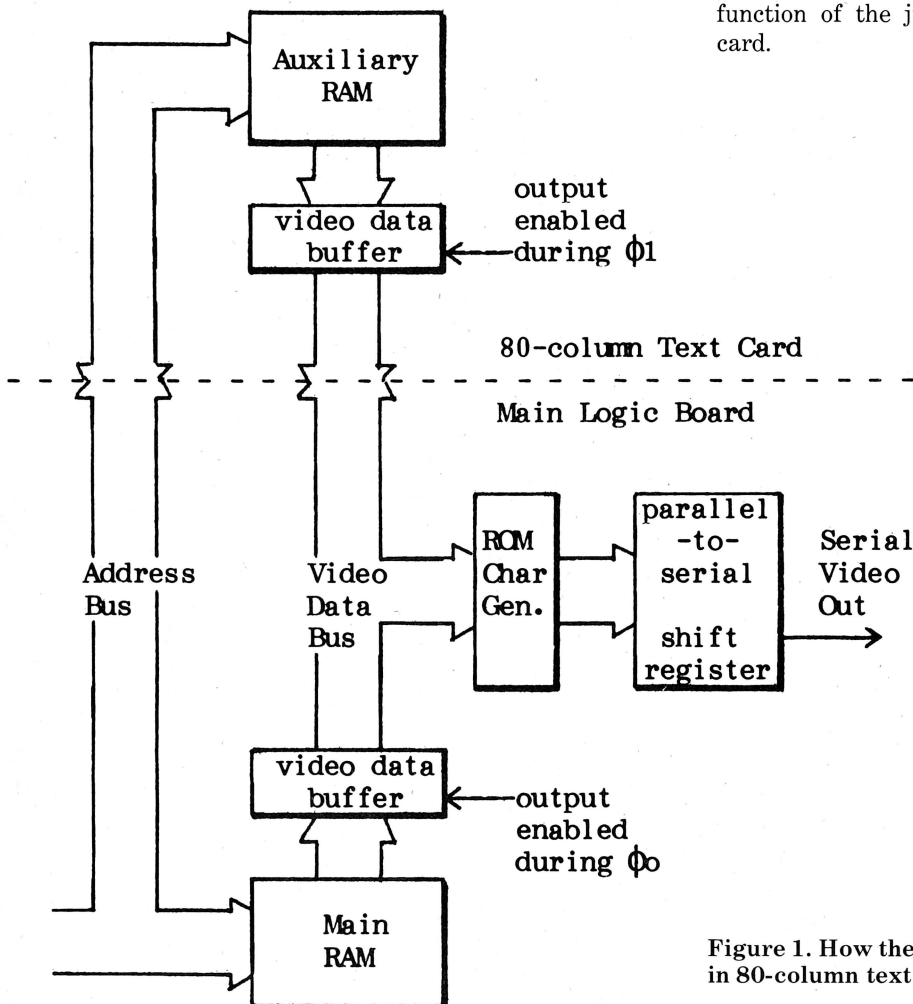


Figure 1. How the Apple //e generates video output in 80-column text mode or double Hi-Res mode.

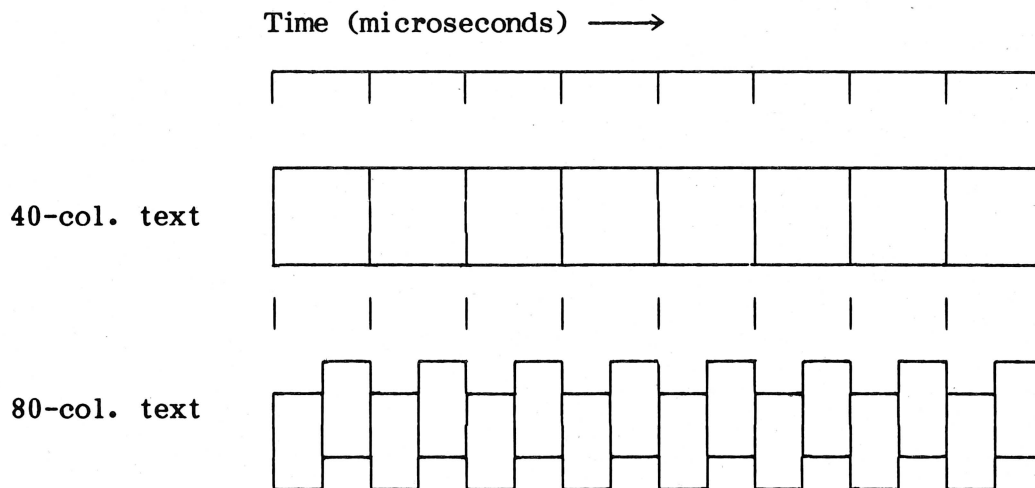


Figure 2. Timing of video data bytes. (For 80-column text mode, the figure shows the boxes for bytes in main memory displaced upward and those for bytes in auxiliary memory displaced downward.)

For programs to use the 80-column text display, they have to be able to store display data into the memory on the card. The memory on the main logic board and the auxiliary memory on the card both have the same addresses. With the addresses the same, there must be some other way for the computer to switch between main memory and auxiliary memory so that the display routines can store data into the 80-column display. The Apple //e has a new soft switch named 80STORE that makes PAGE2 perform this function.

Here are some more interesting questions. Once you have the means to access the 1,024 bytes of text display memory on the card, what's to stop you from putting more auxiliary memory out there and using it for ordinary (non-display) data? Better yet, what happens when you switch to the 80-column timing with the Hi-Res graphics display (assuming there is valid memory in the Hi-Res graphics page on the card)? These questions are answered with the extended 80-

column card, which has 64K of RAM and the double Hi-Res display.

The Hi-Res graphics display is bit-mapped; that is, the actual bit patterns are stored in memory. In Hi-Res mode, the output of the character-generator ROM (shown in Figure 1) is the same as its input. In effect, the ROM simply passes the video data bits on to the parallel-to-serial shift register, which reads seven bits from the ROM and sends them out one at a time. Figure 3 shows the timing of the resulting bit streams. To produce a double Hi-Res display, your Apple //e must have memory on the 80-column card in the address space that corresponds to the Hi-Res graphics page. The computer fetches bytes from main memory and auxiliary memory at the same time and sends dots to the display at the 14 MHz rate. For each pair of bytes, it displays the seven low-order bits from the byte in auxiliary memory (on the card) first, followed by the bits from the main-memory byte.

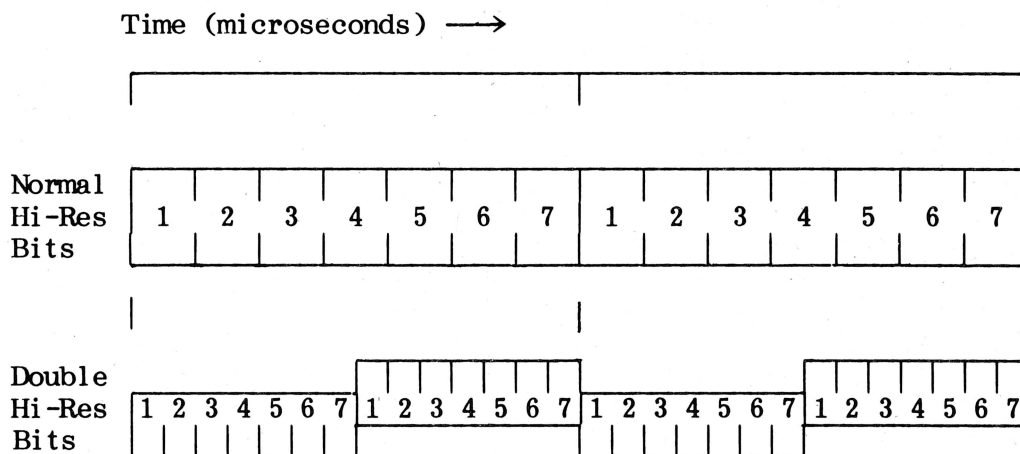


Figure 3. Timing of bits in Hi-Res graphics. (For double Hi-Res, the figure shows the boxes for bits from main memory displaced upward and those for bits from auxiliary memory displaced downward.)

How the Dot Patterns Produce Colors

A full explanation of what goes on when a color television set displays double Hi-Res video is beyond the scope of this article. Color television is strange and wonderful, involving concepts such as phase and pass band that have no exact counterparts in the world of bits and bytes. For our purposes, it is enough to know something about the way a TV set (or a composite color monitor) displays the double Hi-Res video produced by the Apple //e.

The TV set or video monitor extracts the color information from the parts of the video signal that match a certain frequency. The Apple //e generates a video signal made up of dots at the right frequency so that the arrangement of the dots creates the color signals. You can think of the process that goes on inside the TV set as comparing the dot patterns with sixteen virtual templates, one for each color. (Note: The color templates are not real; they are simply the method I have chosen to describe the way a TV set interprets the dot patterns making up the computer's video signal.)

Here is a list of the characteristics of the computer patterns that the TV set decodes to produce color:

- Any horizontal line of four adjacent double Hi-Res dots has a color. (The line of four dots does not have to be on an even four-dot boundary.)
- The color for any four-dot line is defined by the color template that matches the pattern made by the four dots.
- Each color template consists of the same four-dot pattern repeated over and over, starting at the left side of the display.

tern repeated over and over, starting at the left side of the display.

- There are sixteen possible four-dot patterns, so there are sixteen color templates, one for each color. (See Table 5.)
- The TV set blurs together the individual dots in any four-dot line. (Strictly speaking, a display on a TV set cannot have 560-dot horizontal resolution, although it can show 560 different horizontal positions.) When you examine the color patterns in Table 5, you'll find that the way the dots are arranged in the patterns looks backward. That's because the video circuit sends the bits to the display starting with the low-order bit of the byte. For example, for color number one the bit pattern is 0001 and the dot pattern is 1000.

Consider the portion of the double Hi-Res display shown in Figure 4. The scale at the top of the diagram shows bit positions in the color templates. The scale below it shows bit positions in bytes of memory. (Note: The Apple II displays only seven bits from each byte.) To produce an image on the display, you have to set bits on and off in the appropriate memory locations as shown by the scale of bit positions. To produce the desired color, you have to set the bits to match the correct color template.

The four-dot color patterns don't fit onto the seven-dot byte boundaries at all. As a result, the particular arrange-

Bits in
Color
Templates

1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Bits on Byte
Boundaries

1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

1																1	2	3	4											
	2																2	3	4	1										
		3																3	4	1	2									
			4																4	1	2	3								
				1																1	2	3	4							
					2																2	3	4	1						
						3																3	4	1	2					
							4																4	1	2	3				
								1																1	2	3	4			
									2																2	3	4	1		
										3																3	4	1	2	
											4																4	1	2	3

Figure 4. The relationship between bits in the double Hi-Res display page and the color templates.

Color Name	Color Number	Dot Pattern
Black	0	0 0 0 0
Dark Red	1	1 0 0 0
Dark Blue	2	0 1 0 0
Purple	3	1 1 0 0
Dark Green	4	0 0 1 0
Gray 1	5	1 0 1 0
Medium Blue	6	0 1 1 0
Light Blue	7	1 1 1 0
Brown	8	0 0 0 1
Orange	9	1 0 0 1
Gray 2	10	0 1 0 1
Pink	11	1 1 0 1
Green	12	0 0 1 1
Yellow	13	1 0 1 1
Light Green	14	0 1 1 1
White	15	1 1 1 1

Table 5. Names, numbers, and dot patterns for the sixteen colors.

ment of dots needed to draw a color is different for different bytes. To see how this works, look at the top of Figure 4. The bit pattern for the piece of the color template that corresponds to the first byte has the color bits in the order 1, 2, 3, 4, 1, 2, 3. The fourth color bit becomes the first bit in the next byte; the order of the color bits in that byte is 4, 1, 2, 3, 4, 1, 2. The color patterns for the next two bytes are shifted in the same way. Only in the fifth byte does the pattern start to repeat.

As a result of the bad fit between the color templates and the bits in the bytes, the subroutines have to figure out which

of four possible color patterns to use to draw the desired color in a particular byte. That makes the subroutines somewhat complicated, but is of no concern to the programs that use them.

The diagram in Figure 4 shows two diagonal lines. One line starts in the upper-left corner and consists of single dots. The numbers correspond to successive positions in the color templates. If you do all your drawing only in black and white, this method of drawing lines works very well, and gives you the full 560 dots of horizontal resolution. On the other hand, if you try to make color displays this way, you'll run into a couple of problems. For one thing, drawing a single dot does not define an entire four-dot color pattern, so you can't control the color you get: it depends partly on the dot you set and partly on its neighbors. Furthermore, if you try to draw a colored line by setting single dots on or off to match the color pattern, the line will have gaps in it wherever the bit from the color pattern matches the background. (Note: The standard Hi-Res routines in Applesoft show vertical gaps of this kind because they draw colored lines one bit wide.)

To get predictable color, you have to set four adjacent dots to match the color template, as indicated by the wide diagonal stripe starting halfway across the diagram in Figure 4. This method keeps the colors under control and avoids the gaps you get with single-dot drawing in color. If you use a high-resolution black and white monitor, you can see the individual dots in the color patterns and, of course, they don't make colors. On a color TV set or composite color monitor, the individual dots blur together, as indicated in Figure 5, and produce color on the display.

The diagram in Figure 5 shows how the diagonal lines of Figure 4 would look drawn with the color green. Notice that the one-dot-wide line on the left not only has the vertical gaps

Green Color Template

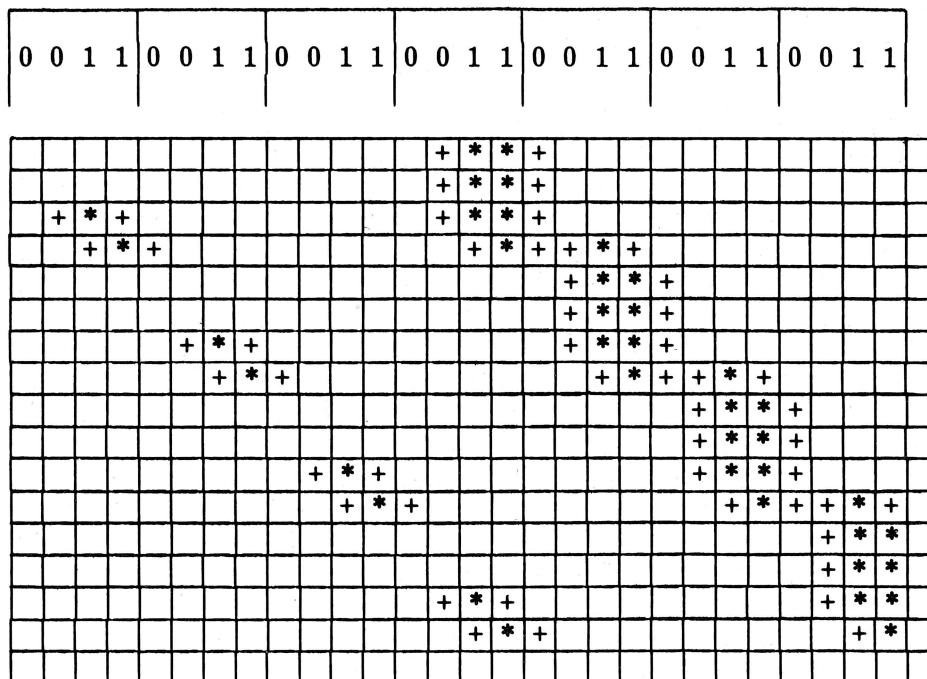


Figure 5. Color dots in lines drawn with the color green. The asterisks (*) represent display dots that are on; the plus signs (+) represent the apparent broadening of the dots caused by the way the TV set works.

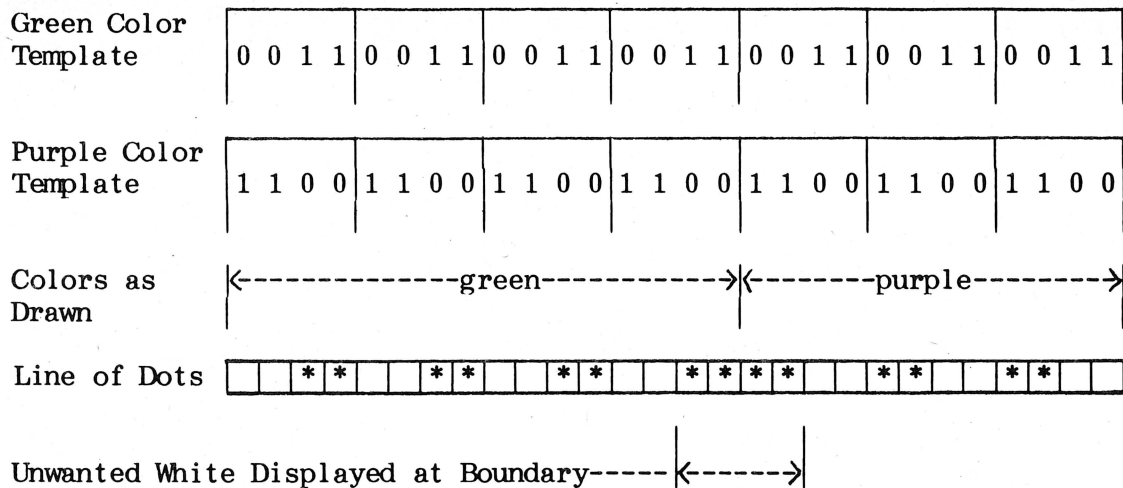


Figure 6. Typical boundary defect with standard Hi-Res colors.

mentioned above, it isn't even green: the color patterns that have single dots in those positions produce the colors dark green and brown. Also notice that the effective resolution goes down when you draw in color. The diagonal lines that stepped by single dots when drawn in white on black now make three-dot steps for an effective horizontal resolution of 185.

Even though it's superior to standard Hi-Res in many ways, sixteen-color Hi-Res still suffers from the color interference along vertical boundaries that we're all familiar with in standard Hi-Res. As you might expect, using the standard Hi-Res colors in a double Hi-Res display produces the same effects that you get with standard Hi-Res. Figure 6 is a diagram showing what happens at the boundary between two standard Hi-Res colors in a double Hi-Res display. Remember that the TV set or monitor acts as if it were scanning the dot patterns with a four-dot window and interpreting the four-dot color patterns on every dot boundary. Where unlike colors touch, the four dots that span the boundary make up

another pattern that the TV set displays as another color. (In this case it's white, but changing the position of the boundary between the colors can change the unwanted color to black or some other color.)

The unwanted boundary colors in sixteen-color displays are sometimes less apparent than you might expect. The worst cases of interference occur with the standard Hi-Res colors; surprisingly, many of the added colors do not misbehave so badly. If you experiment with different colors at the boundaries, you'll discover that the interference is much less between related colors. (One way to determine whether two colors are related is to compare the color numbers bit by bit. If all the bits that are on in one bit pattern are also on in the other, the two colors are related.)

For example, Figure 7 shows a boundary between the related colors dark green and light blue. In this case, there is no interference at all: the dot pattern on the boundary (1011) matches the pattern at that position in the light blue color template.

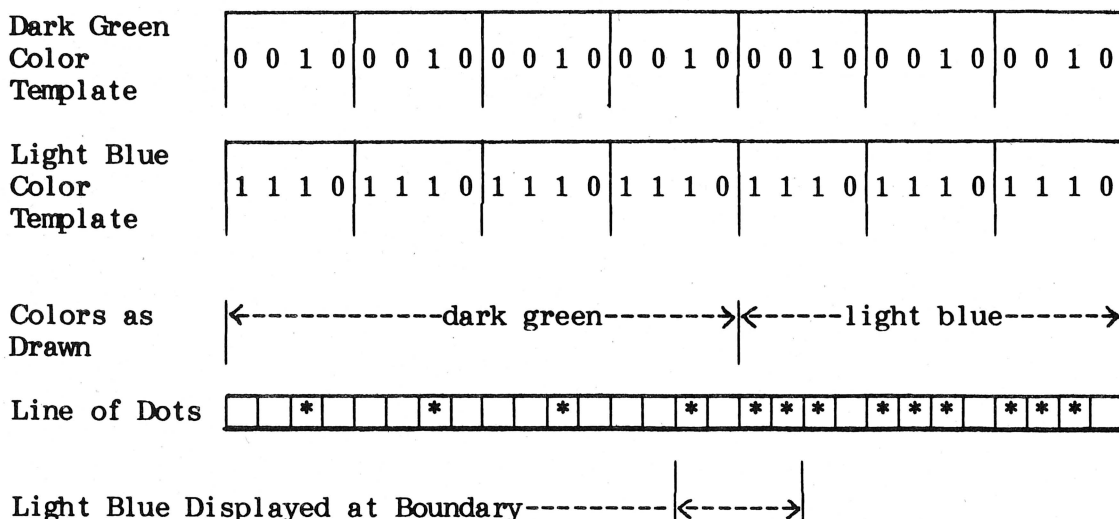


Figure 7. Absence of boundary defect with some double Hi-Res colors.



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Software from the Consumer's Point of View

by Louis H. Milrad

AT LEAST HALF of the available applications software that would have been acceptable to the microcomputer user two years ago would now be discarded as ineffective or insufficient. The sophistication in hardware has been very closely accompanied by substantially improved, first class and very efficient software. Early microcomputer software products were the efforts of small, new firms; many of these became quite successful.

Realizing the business potential, many of the traditional minicomputer software houses have gotten into designing applications programs for microcomputers. These companies have used their experience in user response, friendliness and reaction to modify many of their minicomputer applications. General accounting programs, for example, have become fully integrated modular packages designed by people with a business background. Contrast that with the question asked by an early programmer: "What's an audit trail?"

There's a wide selection of software for any particular application. It doesn't take much thought to name fifteen word processors for the Apple II, with varying levels of sophistication. A key point to remember when making your selection: some of these word processors were created by touch typists and some were not; the control/function key layout may not follow *your* habits.

Similarly, a mild flood of user definable data bases is now occurring. New and improved spreadsheet programs are also appearing. More and more specific applications are also on the market. Competition is keen, and in order for a software supplier to survive in this marketplace, he or she must remember that today's user is more sophisticated and critical than the user of even a year and a half ago.

All of a sudden, the minicomputer manufacturers and word processing people are no longer ignoring the very prominent presence of the microcomputer in the business environment. The difficulty seems to be, however, how these manufac-

APPLE II Outperforms IBM PC with 'Supermini' Virtual Memory Technology

If you need to get SERIOUS, POWERFUL, PROFESSIONAL results from your II + /e, for Business or Engineering applications, nothing comes close to MegaTASK PLUS! Modelled on and developed from minicomputer-based commercial timesharing software available to large corporations for thousands of dollars annually, MegaTASK PLUS is primarily designed for the APPLE II owner who demands quick, effective analytical solutions to business problems—and immediate RELIEF from the frustrations and limitations of using hundreds of dollars of mutually-incompatible 'canned' software packages, or WORSE, programming in Applesoft, assembly or Apple DOS!

MegaTASK PLUS is a combined, multi-product hardware-and-software package that provides an instant **Virtual Memory** expansion, an Applesoft-compatible **SuperBASIC**, and a series of **Business Management** packages that greatly enhance the power and value of the APPLE II in both **systems programming** and **business applications** areas. MegaTASK and MegaDOS employ multitasking, virtual memory optimization and virtual storage technology, which, until now, were limited only to mainframes and the 'super' minicomputers. The SMARTCHIP™, an Intel 8748 Single-Chip Plug-In Microcomputer, provides sufficient processing power to enable your APPLE II to outperform both the IBM PC and Apple's new Macintosh computer. Yet, all you need to begin is an APPLE II series computer plus one diskette drive. And generally, no modification to your existing Applesoft programs, assemblies and DOS 3.3 files is necessary.

MegaTASK and MegaDOS accordingly generate an enormous enhancement to the power available to the APPLE II owner, specifically:

- Multitasking System processing techniques. (As many as 16 PROGRAMS or TASKS can execute at one time).
- The MegaDOS VS/OS (Virtual Memory Operating System) can place within reach of your system MEGABYTES of Virtual Memory. Largest program size: 8 Megabytes. Largest ISAM file: 451 Megabytes. Largest transparent core array: 75 million FP numbers.
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On the applications side, the 'PLUS' portion of MegaTASK PLUS includes:

- Hardcopy and screen Business Graphics, Calc, Database Management and Word Processing Applications Packages—plus Custom Modifiability.
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The MegaTASK PLUS product package includes:

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- Six diskettes PACKED with applications programs, including Mega GRAPH, Mega EDIT, Mega TEXT and several Report Generator examples.
- A One-year Replacement Warranty on all products.
- A 60-day Financial Risk-Free Return Policy. If you are not completely satisfied you can return the product in good condition with proof-of-purchase for a complete refund.
- A 14-hour-per-day telephone Hotline to support you in your use of the entire MegaTASK PLUS series of software packages.

Because of the much larger amount of memory that is available to the Apple's microprocessor through Virtual Memory, the increased processing speed, and the integration of major applications packages PLUS custom modifiability by users who know Basic, MegaTASK PLUS may well surpass or replace most of the worthwhile APPLE II program packages currently available on the market. With the introduction of this product, Quantum Leap has made a commitment to be the technology leader in the area of business software systems for personal computers. This will be achieved through Quantum Leap Technologies' continuing Applications Software Package Series—quarterly diskettes and manuals mailed free to purchasers of MegaTASK PLUS for one year from date-of-purchase.

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turers fit into the market. IBM has introduced its own personal computer. Wang offers a CP/M package for its word processor. Digital offers its small computers, and Xerox markets a CP/M package for its stand alone dedicated word processors.

Software

The cost of a packaged (rather than custom-designed) applications program for a microcomputer ranges from one eighth to one fifteenth of the cost of a similar package on a minicomputer system. Once the initial package is developed, the software house will attempt to recoup its developmental cost(s) through volume sales. Given the number of microcomputer systems in the marketplace, there is a vast and growing potential for any microcomputer software package; certainly much larger than the minicomputer market. Given this marketplace, there is also a natural forum for illegal duplication and distribution of *bona fide* software applications.

Generally, when a user acquires a microcomputer system, he acquires it for a particular use and the appropriate software application packages will be identified to that user either through his own research, advice of other users, or his dealer. In acquiring the neatly-bound software applications packages, the user should bear the following in mind:

1. In most instances, the user is not purchasing *de facto* ownership of the software, but is only purchasing a right or license to use that software under certain limited conditions.
2. The right or license is generally terminable or cancellable by the licensor (usually the software house) of the software if the user, as licensee, breaches or violates any of the terms of the license.
3. The license is what is generally referred to as a "non-exclusive, non-transferrable" license, which in effect means that the software house retains title to the program and may enter into any number of agreements with any number of users. It also means that your license as a user is for your own personal use on a single computer at a single location.
4. Although not evident in many of the earlier software application packages, there is a growing tendency to include as part of the manual a user licensing agreement which states that if you wish to make use of the product, you do so under the terms of the licensing agreement. By signing and returning the warranty/registration card, you agree to this.
5. Software user or licensing agreements and documentation will specifically note that the program and all documentation are copyright protected and are proprietary to the publisher or author, and that any duplication of the manual (which is generally prohibited in the documentation) or the program (provided that it may be duplicated only for back-up or archival purposes) may result in the user being liable for unauthorized duplication and distribution.
6. The software packages will contain the broadest available "disclaimer clauses" which in effect provide that the software is being sold on an "as is" basis and that although the software house may warrant the storage medium to be free from defects in workmanship and materials, it is the user who assumes all the responsibility for operation of the program and any possible malfunctions or loss of data by the purchaser. It is a typical "buyer beware" situation.

Some Advice on Purchasing Programs

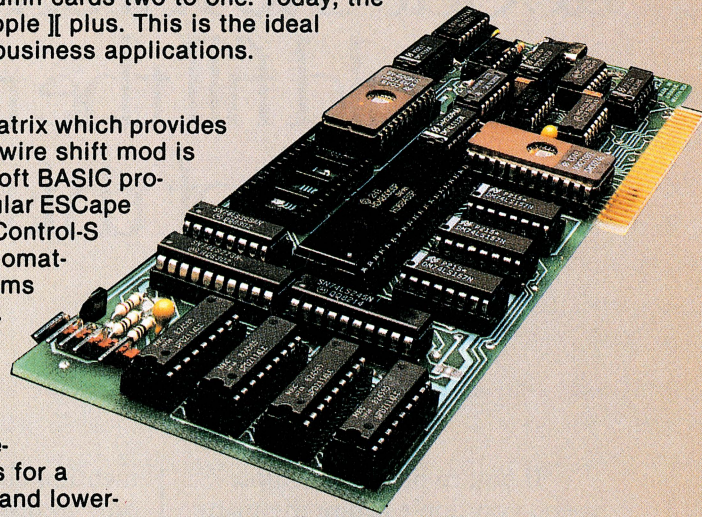
1. Many software houses have engaged in a technique known as protecting or "locking" the program disk so that the user is, or should be, unable to duplicate it. Although this is done to protect the proprietary interest of the software house and to prohibit (or inhibit) unauthorized duplication, prior to acquiring the package, ascertain that particular software house's policy on providing back-up disks. Ideally, if the disk is locked, the company should provide two identical disks, one of which can be returned for replacement if damaged (normally at a *nominal* fee) while you use the other one. Be cautious about purchasing any software that does not, at the very least, offer this opportunity.
2. Assuming that the software licensing agreement authorizes the user to duplicate the diskette, ensure that the very first thing you do is to make one back-up disk. Actually, the copy you made isn't the back-up; it's the disk you'll actually use in daily service while the original is in a safe place.
3. Buy a number of blank disks at the same time, and become suspicious of any disk you've used for more than six months. Regular and cautious data back-up techniques should be followed, bearing in mind that the disks are relatively inexpensive, and back-up is a relatively quick process. The consequences of not backing up data are far worse than taking a few minutes every day to do that job.
4. When purchasing packaged software, ensure that the version you are getting is the most recent one of that particular package. It is not unusual for software suppliers, in their efforts to remain competitive, to up-date their packages throughout the course of the year. If you are uncertain as to the currency of the version, make a note of the version number or serial number of the package and call the supplier.
5. Before purchasing the software, ascertain what the policy of that particular software publisher is with regard to:
 - a) replacing blown or damaged disks (remember, it only takes a bit of static electricity);
 - b) keeping you abreast of revisions and updates of the package (is there a procedure for this, and how much does it cost?);
 - c) how receptive are they to questions on problems encountered in operation of the software? Note that dealers are most often not familiar with the finer points of all of their products; they sell a wide variety of goods. If you have a problem you'll likely be dealing with the manufacturer.
 - d) Is the program furnished in source code form and if so, is it user-modifiable? What effect does any modification have on the warranty, or on revisions and upgrades? Many application programs have been locked, unmodifiable, and rigid; these are now giving way to programs that allow the user to set keyboard command codes, set up internal parameters for files and data, etc.

These are the major points to consider in an applications software purchase, except for the most important one of all: does the package offer features that help you do your task? In virtually every case, there is more than one product that can do what you want. Don't be led into buying the first or second package you see.

Videoterm™ The Best Selling 80-column Card For Apple®

By the end of 1982, the Videoterm had outsold all other 80-column cards two to one. Today, the Videoterm continues to be the standard for the Apple II and Apple II plus. This is the ideal 80-column card for word processing, spreadsheets, and other business applications.

With the Videoterm, you can display your text with a 7 x 9-dot matrix which provides upper and lower case letters with true descenders. The single-wire shift mod is also supported. The Videoterm will list both Integer and Applesoft BASIC programs using all 80 columns without splitting keywords. The popular ESCape sequence editing capabilities and a stop-list function using Control-S are supported. If you install the Videoterm in Slot #3, it will automatically be used by Pascal and CP/M, since these operating systems recognize the Videoterm as a standard video display terminal.



Apple IIe Kit

This kit contains an OPTIONAL Videoterm firmware and a redesigned softswitch for the Apple IIe. This OPTIONAL firmware is for a BASIC programmer and includes: NORMAL, INVERSE, HOME, and lower-case entry of BASIC commands.

The Videoterm has no trouble keeping up with 1200 baud modems during normal printing or scrolling. The Videoterm is not compatible with cards plugged into the auxillary slot of the Apple IIe. For this situation, we recommend the UltraTerm display card.

Videoterm Utilities Disk

The six programs on the Videoterm Utilities Disk will complement the creativity of the 80-column screen. This disk contains:

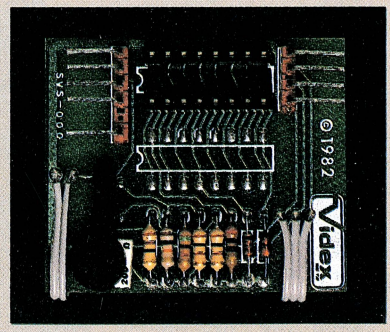
- | | |
|--|---|
| GRAPHICS TEMPLATE — Create a business form in 80 columns | PASCAL DEMONSTRATION PROGRAMS |
| SCROLL UTILITY PROGRAM—Set a window in 80 columns | VIDEXGRAPHICS—Provides MID-RES Graphics in Pascal |
| FONT EDITOR—Create new character fonts | MID-RES GRAPHICS—Graphics in 80 columns |
| READ SCREEN—Read characters from screen locations | |

Alternative Characters

Spanish
 Š Ĩ Ñ Ł ' ° ñ ç ~
 French
 £ à ° ç Š ' é ù è

The Videoterm comes with ASCII standard character set. There is a second socket for an alternate character set. You may choose from foreign languages, inverse, underline, APL language, symbol (math and Greek), and line drawing graphic character sets.

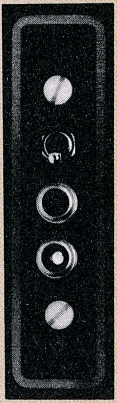
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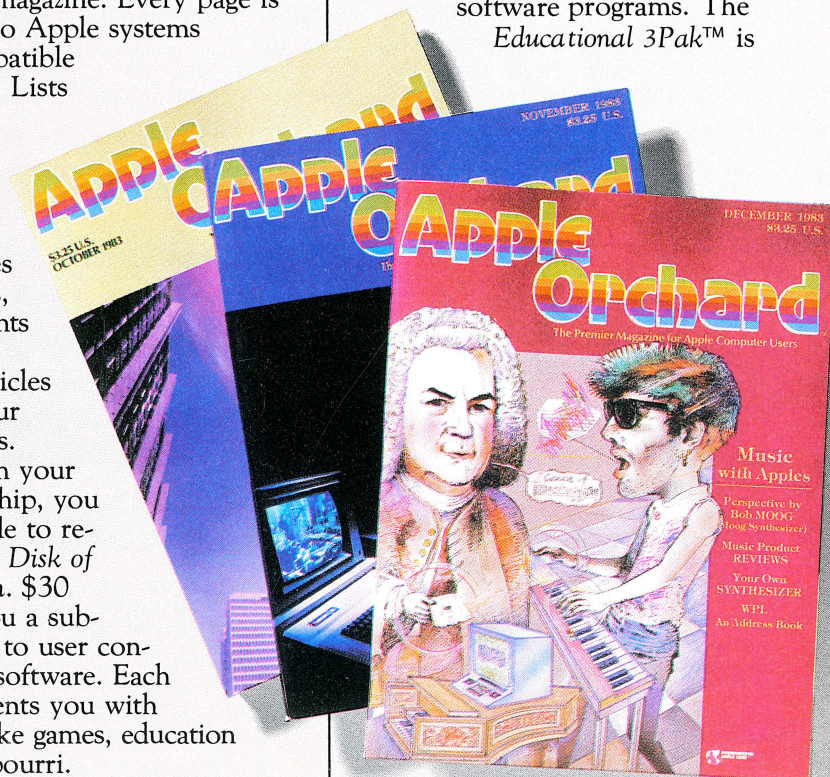
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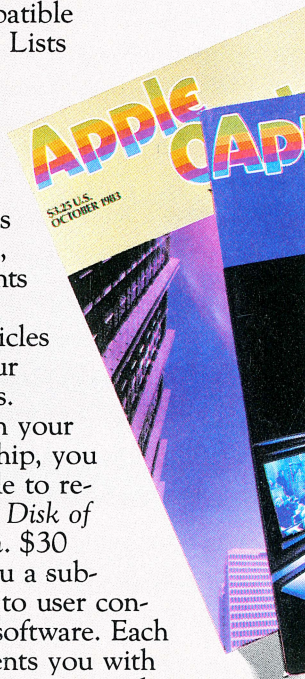
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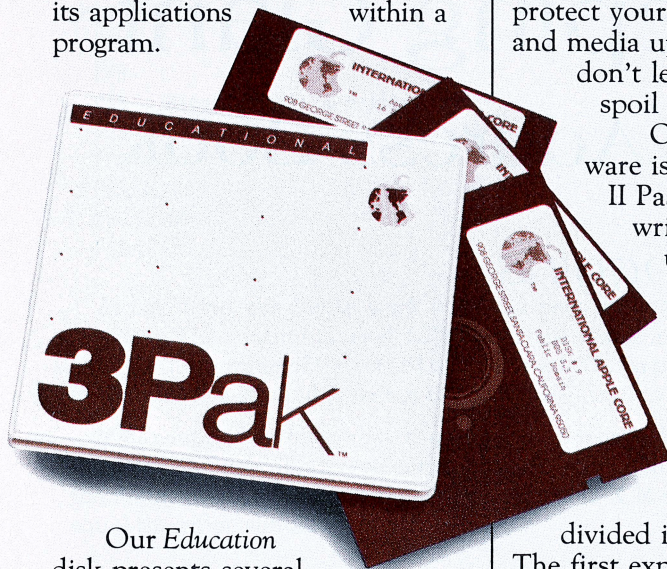


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WPL - The Sleeping Giant

Part III - More on the Address Book

by Richard Loggins

Before we get into this month's article, it's time to reinforce something that has been said earlier. WPL is a language, included with the AppleWriter word processor. And like any other language, it can't be learned by reading three or four articles. You have to boot AppleWriter, and get in there and work with it. The entire purpose of this series is to introduce a little of WPL's power and capabilities, and to show it can be a useful tool of which you should take advantage.

As more people become interested in WPL, more information and applications will surface; it's just like the VisiCalc templates. There is even a rumor floating around that a detailed, continuing course on WPL may be available soon.

Last time, we completed a portion of The Address Book. As it was left, an address file could be created, names could be added, and a letter could be printed without insertions. Now we'll add two more WPL programs that will allow a name to be deleted, and the file to be renumbered.

Since both of these will be accessed from the program named "WPL2", they will be named "WPL2.1" and "WPL2.2" respectively. It's important that they be placed on the same disk as your "WPL1" and "WPL2" programs from previous articles.

The same format and rules for indentation, etc., that have been used will remain in effect. One more special notation will be added, since it can't be printed. Any symbols enclosed between "[" and "]" are *control* characters. These must be entered by pressing CONTROL-V, followed by the control character you want, and then CONTROL-V again. For example, if you saw [G], it would be entered as CONTROL-V CONTROL-G CONTROL-V.

WPL PROGRAM: WPL2.1 (Part I)

```
START NY
  PND
  PGO MENU
LP1 PPR
  PSZ - 1
  PGO LP1
  PRT
TITLE PPR<Backslash>
  PPR      ***** The Address File - Delete *****
  PPR
  PPR
  PRT
FNAME PSR TITLE
  PSZ 6
  PSR LP1
  PIN      Name and location of file: = $D
  PCS/$D//
  PDO .D1/WPL2
  PPR
  PPR
  PPR      Loading the file.....
  L $D
  PRT
MENU PSR FNAME
```

The first part of the program clears the text editor and turns off the display. LP1 is a subroutine to print blank lines, and is followed by the subroutine TITLE. TITLE clears the video monitor (remember to use CONTROL- Backslash), prints the title, and a two blank lines.

Next is another subroutine called FNAME. FNAME calls the subroutine title, and obtains the file name. A comparison is made to see if just the RETURN key was pressed, and if so returns to WPL2. Otherwise, the file is loaded into memory.

So far, all of the routines have been subroutines that will perform specified functions. The next line, labeled MENU, is the routine that starts everything happening. It calls the subroutine FNAME, which in turn calls TITLE.

WPL PROGRAM: WPL2.1 (Part II)

LP2 PSR TITLE

```
PPR
PPR
PIN    Record number to delete: = %C
PCS/%C//
PGO ABORT
PCS/%C/0/
PGO ERROR
PSX %C
```

At this time, the file to work with has been loaded into memory. The routine labeled LP2 clears the monitor, and asks for the number of the record to be deleted. This is placed in the variable %C, and is tested to see if the entry is valid.

If %C contains nothing, control of the program branches to ABORT. If %C contains a zero, control branches to ERROR. If the result of both tests are invalid, the variable X is set to equal the value contained in %C.

WPL PROGRAM: WPL2.1 (Part III)

FIND PSR TITLE

```
PSZ 6
PPR    Searching the file. . . .
PPR
PPR
```

LP3 B

```
F/<(X)>/
PGO FOUND
PGO NOTHERE
FOUND PPR
PPR    Deleting the record. . . .
B
PSY (X)
PSY +1
F/<(Y)>/!!!<(Y)>/
Y?
B
F&<(X)>'!!!&&
```

```
Y?
B
PLS#!-!-!-=$A
PSY $A
PSY -1
B
F*+*-*(Y)-*
Y?
```

After the record number to delete has been entered, control passes to the routine labeled FIND. The video display is cleared, and a message is displayed informing that the file is being searched.

The routine labeled LP3 is where the actual search is conducted. The cursor is set to the beginning of the file. Next, the find command is used to see if the record number exists in the file. If the record is found, control passes to the routine named FOUND. If not, the program branches to NOTHERE.

When it has been established that the record exists, the routine FOUND displays the message that the record is being deleted. The cursor is again set to the beginning of the file, and the variable Y is set to equal the variable X. Y is then incremented by one.

Now X contains the record number to be deleted, and Y contains the number of the record after X. Using Y, the record number at the record we wish to delete has three exclamation marks inserted just in front of the record number. Making the assumption that X equals 24 and Y equals 25, it appears in the file as:

```
!!!<25>
```

Now that the special marker is in place, we go after the record to be deleted (in this case, record 24). Again, the cursor is placed at the beginning of the file. The statement:

```
F&<(X)>'!!!&&
```

says to find the portion of the file that begins with {24}, followed by any length of characters (symbolized by '), followed by !!! We know this exists in memory, as the record has been found in the routine LP3, and we have just inserted the three exclamation marks. Once this is found, replace it with nothing (&&). Thus, the record is deleted.

But that doesn't finish the job. Once again the cursor is placed at the beginning of the file. The load string from memory command is used to place the number of records in the file into \$A, without including the hyphen delimiters.

This value is assigned to the variable Y, which is decremented by one. Again, the cursor is set to the beginning of the file. At this time, Y contains the total number of records in the file after deletion. This number replaces the old quantity at the beginning of the file, keeping it nice and tidy.

WPL PROGRAM: WPL2.1 (Part IV)

CHECK PSR TITLE

```
PSZ 6
PPR    Record number (X) deleted. . . .
PPR
PPR
PIN    Delete another record ("Y" or "N") = $A
PCS/$A/Y/
PGO LP2
PCS/$A/y/
PGO LP2 PSR TITLE
PSZ 6
PSR LP1
PPR    Saving the changes. . . .
S $D
PPR
PPR
PPR    Returning to Address File menu. . . .
PDO .D1/WPL2
```

The routine named CHECK informs you that the record was deleted, and asks if you want to delete another record. If yes, then control branches back to LP2.

If no more records are to be deleted, the entire file is saved to the disk, and the program executes WPL2, the menu of the address file.

WPL PROGRAM: WPL2.1 (Part V)

```
NOTHERE PSR TITLE
PSZ 6
PSR LP1
PPR   Record number (X) was not located. . . .
PPR
PPR
PPR
PIN   [CTRL-G] Press "RETURN" . . .
PGO MENU ERROR PSR TITLE
PPR   [CTRL-G]
PSZ 6
PSR LP1
PPR   ERROR: Lowest record number in any file is "1"
PPR
PPR
PIN   Press "RETURN" to continue. . . .
PGO LP2
ABORT PSR TITLE
PSZ 6
PIN   Quit the delete record mode ("Y" or "N"): = $A
PCS/$A/Y/
PDO .D1/WPL2
PCS/$A/y/
PDO .D1/WPL2
PGO START
```

The last three routines in this program are error trapping routines. The routine named NOTHERE is called if the program couldn't find the record number that was to be deleted. It simply informs you the record wasn't located, rings the bell, and returns to MENU.

Remember the [CTRL-G] must be entered as CONTROL-V CONTROL-G CONTROL-V. If you simply enter what you see, it will just print what you see.

The routine named ERROR is used to inform you of the lowest record number in any file. The routine named ABORT allows what its name implies — it allows you to abort this program and return to WPL2.

After a record has been deleted, it is important to renumber the file. If the file isn't sequentially numbered, the program to automatically insert and print letters will not work. The program to renumber the file is quite simple, and is named WPL2.2. It is selected from the menu of the program named WPL2.

WPL PROGRAM: WPL2.2 (Part I)

```
START NY
PND
PGO MENU
LP1 PPR
PSZ 1
PGO LP1
PRT
TITLE PPR<Backslash>
PPR   ***** The Address File - Renumber *****
PPR
PPR
PRT
```

```
FNAME PSR TITLE
PSZ 6
PSR LP1
PIN   Name and location of file: = $D
PCS/$D//
PDO .D1/WPL2
PPR
PPR
PPR   Loading the file. . . .
L $D
PRT
MENU PSR FNAME
PSR TITLE
PSZ 6
PSR LP1
PPR   Ready to renumber file: $D
PSZ 4
PSR LP1
PIN   Press "RETURN" to begin
PSR TITLE
PSZ 6
PSR LP1
PPR   Renumbering $D. . . .
PSX 1
B
```

The first part of the program uses the same types of routines you should be familiar with by now. It clears the text editor memory, the video display, and asks for the file to be renumbered. The only items of significance are that it sets the variable X to equal one and it places the cursor at the beginning of the file. This is accomplished in the last two lines.

WPL PROGRAM: WPL2.2 (Part II)

```
SEARCH
F&<'>&<(X)>&
Y?
PGO INCREM
PGO RESET
INCREM PSX +1
PGO SEARCH
RESET B
PSX -1
F&-'-&-(X)-&
Y?
P
PPR
PPR
PPR   Saving file: $D. . . .
S $D
```

Okay. The variable X has been set to one, and the cursor has been placed at the beginning of the file. The entire routine depends on these two items, so if it isn't correct it won't work.

The routine named SEARCH is where the entire file will actually be renumbered. With the cursor at the beginning of the file, SEARCH will find the first occurrence of "{" followed by any length of characters, followed by "}", which contains the first record number. The actual number contained between these symbols, doesn't matter, as it will be replaced.

When it is found, it is replaced with the current value of X (in this case, the value of one), and terminates the search (caused by the question mark). At this time, the cursor direction is still pointing forward, and its position is immediately following the first record number.

Since the search was successful, no error was generated, and the statement "PGO INCREM" is executed. INCREM simply increments the value of X and sends control of the program back to SEARCH.

The next record number is replaced with the value of X. INCREM increments X again and branches back to SEARCH. This loop will continue until the find and replace command contained in SEARCH cannot find any more left and right pointing brackets.

As soon as this happens, an error is generated and the "PGO INCREM" instruction is skipped. This causes the program to branch to the routine labeled RESET.

RESET places the cursor at the beginning of the file. It then *decrements* the value of X by one. Why? If you will remember, each time a record number is replaced, X is incremented in preparation for the next record. Since the next record was not found, if X is decremented by one it will contain the total number of records in the file.

The current value of X replaces the old number of records in the beginning of the file. The entire file is then saved to disk, all nice and renumbered.

WPL PROGRAM: WPL2.2 (Part III)

DONE PSR TITLE

```
PSZ 8
PSR LP1
PPR   File $D has been renumbered. . . .
PSZ 4
PSR LP1
PIN   Renumber another file ("Y" or "N")? = $A
PCS/$A/Y/
PCS/$A/y/
PGO START
PCS/$A/N/
PDO .D1/WPL2
PCS/$A/n/
PDO .D1/WPL2
PGO DONE
```

After the file has been saved, you have the option to renumber another file. If you choose to do so, back to the start of the program you go. If not, WPL2 is executed.

If you have been following this series, you now have a series of WPL programs that will allow you to create and maintain an address file. The only missing portion is a program to automatically insert the information contained in your address file into a letter or other document and print it. This will be accomplished by the program named WPL3.

That's the one we'll cover next month.



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Alpha Logic Business Systems, Inc.
4119 North Union Road • Woodstock, IL 60098
(815) 568-5166

EPS Keyboard

Review by Woody Liswood

Manufactured by:

Executive Peripheral Systems, Inc.
800 San Antonio Road
Palo Alto, CA 94303
(415) 856 - 2822

For the past few months, I have been using a separate keyboard for my Apple II. It has changed my entire pattern and practice of using the Apple. In fact, I'm not so sure that I will ever be happy with just a standard keyboard again, even though I used to use a Videx Function Strip to get some of the functions contained in the EPS keyboard.

A Description

The EPS unit is about 19 inches across, about nine inches wide, and slopes from about 3 inches high in the back to about 1.5 inches high in the front. It has a regular typewriter keyboard, with everything in its proper place. CONTROL, ESC, and RESET, are located along the left side of the keyboard and all must be pressed together to cause a reset. To the right of the normal typewriter keyset are two sets of keys. On the top is a set of six keys. Four are arrows: up, down, left, and right. In addition, there is an L and an R key. That takes you a word left or word right as appropriate for your software.

Underneath those six keys is another set of six keys, called edit keys. When configured for WordStar, one of the keys is a character insert key which toggles the insert mode. Another is a character delete key which works the same as a CTRL-G. There is also a line insert and line delete key. The two remaining keys are labeled S and R. The S starts the WordStar Find function while the R starts the WordStar Find and Replace function.

Next to the those two sets of six keys is a number pad with some special characters. In addition to the numbers, there is a "000", a "00", a Skip and a Backspace. There is also a minus, a comma, and an ENTER key. Just above the number pad is a plus symbol, a divide symbol, a multiply symbol and a key labeled PROG.

If that were not all, there is a set of 12 additional function keys arrayed across the top of the keyboard. Each of those keys is programmed to have many meanings.

You set up the keyboard by taking the cover off of your Apple and plugging the EPS keyboard into the same socket which used to hold your normal keyboard plug. Then, you let that attachment cable run to the outside of the Apple. The keyboard itself connects to the computer with a coiled telephone type line cable. So now I have the Apple sitting away from me under a shelf and use the EPS keyboard almost as a single unit computer. It is nice to be able place the keyboard and the screen where I want them and not to have to worry about the Apple.

EPROM Control

Last, and probably most important, the EPS keyboard comes with EPROMs preprogrammed to give you control over the function keys. Each of those modules comes with a plastic overlay so that you can see what the particular function of each of the function keys is for that module.

I have worked with four of the modules. As I type this review, I am using a module which programs the keyboard with WordStar responses. That's if I leave the PROG key up. If I press the PROG key down, the keyboard would be programmed to have CPM and BASIC commands.

Do not let those 12 keys fool you into thinking that there are only 12 possible codings you might have. Each key works by itself to give you one response. Each key then gives you a different response if you press it while holding down the shift key. Then you can hold down the control key while pressing the function key. Then you may also hold down the shift and the control keys to get even more special characters. In fact, you can get a set of special ASCII characters like a backslash, a vertical line, a tilde, and a backward apostrophe as well as some others by using those combinations.

There is also a covered compartment across the top of the keyboard which will hold up to 10 EPROMs, as well as the plastic strips which will fit over the function keys.

EPS also has an instruction set on how to prepare your own EPROMs so that if you do not particularly like their choice of functions, you can design your own. The instructions are very complete, but since I did not have access to a PROM burner, I did not try to make one up.

I have used and tested extensively four of their EPROMs: WordStar plus BASIC & CPM; a VisiCalc plus BASIC & DOS; Apple Writer II plus BASIC & DOS; and a Your Program plus BASIC & DOS. The "Your program" EPROM just has various Control characters attached to the function keys so that you might be able to use them for your own needs. I use that EPROM when I use SpellBinder, since there is not yet a SpellBinder Module available.

With all of the potential combinations of characters and macros available with this keyboard, you will be way ahead of the game in using effectively and efficiently the complicated programs for which there are EPROMs available. You may even find your programming and disk operations somewhat more satisfying. Rather than type **CATALOG** every time you want to see your disk, you just touch a function key and the word "CATALOG" is printed on your screen; then a «RETURN» completes the work. That is two keystrokes vs. eight keystrokes just to catalog your disk.

When I first started using the keyboard, I was not too impressed. I already knew, by heart, all of (well, most of) the commands to drive WordStar and VisiCalc, and it took more time to find them on the function strip than it would have had I just pressed them as usual. However, after I forced myself to learn the keyboard, I found that having all of those things as single keystrokes has made things much easier when I move from program to program. If you purchase the keyboard when you start to use those programs, you will not have to go through a relearning phase.

PROG Switch

When the PROG switch is down, you normally have a set of BASIC or DOS or CPM commands, depending on what the major module was designed for. The function keys, then, give you macros which do much of your typing for you. The EPS keyboard uses that PROG switch to double the capabilities of the keyboard for each of the EPROMs. EPS has designed the modules so that you would get a specially programmed module for a specific program (PROG switch up), with DOS and BASIC commands as the other set (PROG switch down). That way you do not have to insert a new module each time you boot the computer or finish working with a specific program. Works very well.

For example, if you are using DOS, you have commands like CATALOG, PR#, RENAME, REM, LIST, BRUN, BLOAD, BSAVE, EXEC, PEEK, POKE, HOME, INITIALIZE and so forth each available with the touch of a single key. If you do a lot of work, then these could save you many keystrokes. In fact, the only question about the keyboard would come from the DOS commands. The same key contains both the CATALOG and the INITIALIZE command. A regular press gets you the word CATALOG. A Shift and keypress gets you the word INITIALIZE. If you are half asleep and go for the INITIALIZE when you wanted CATALOG, you might press «RETURN» before you are awake and INIT away the data on a disk. A remote possibility? Maybe, but a possibility with devastating consequences.

Documentation

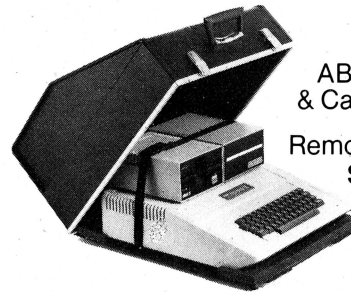
The documentation is short and to the point. It covers how to install the keyboard, how to use all of the features, and then goes over each key in detail explaining what feature is found with each of the possible modes for that key. I found it easy to use and understand. In fact, I only glanced at the documentation to find out how to install the keyboard. I was able to figure most of the other goodies out through use of the plastic overlays which accompany each of the EPROMS. I then looked up the functions available with the two six key blocks and was all set to use the keyboard.

Summary

After three months of use, I have had no failures or problems of any sort. I picked three months figuring if there would be a problem it would show up in that period of time, especially since I use the computer on a daily basis. I would recommend the EPS keyboard to anybody who uses their computer for business. The extra features, the shift key, the EPROMs, make the EPS keyboard a necessity. If you were planning on trading in your II for a //e, you might check out the features of this keyboard before you make the switch. This keyboard will give you everything you will find on the //e, and allow you all of the extra goodies which come with the function keys. Unless you have special software which will only run on the //e, you might be better off to save your money and get a EPS keyboard. In other words, try it; you will like it.



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Circle HelpCard No. 18

Apple Dot Matrix Printer and Burtronix Printercard ///

Review by Eugene M. Paymar

Have you ever walked through a large supermarket, seen various products with the market's private label on them, tried some, and found that they are often better than the more familiar "name brands"? Have you ever wondered where they came from? Many years ago I asked that question of my father, who was the head buyer for a supermarket chain. He told me that many fine small canneries and packers with quality products exist, but they lack the financial resources to advertise and gain market share against large and well entrenched competitors. They find it more profitable to submerge their own identities and simply private label their products. "*What does this have to do with a computer magazine?*", you ask. Patience, gentle reader, for you are about to learn that the technology may get higher, but the tyranny of the marketplace remains, unchanging and unyielding.

Once upon a time, a little known Japanese company named Tokyo Electric Technology came up with a marvelously designed printer mechanism. But, faced with the prospect of competing in a mature printer market, they took the path trod by the canneries before them and sold out their production to C. Itoh. C. Itoh in turn not only packaged it under their own name (8510 Prowriter), but also that of Digital Equipment Corporation and last but not least, Apple Computer. Yes, underneath the package shell, all of the above printers are *mechanically* identical (but not necessarily electronically identical).

Physical Characteristics

The Apple Dot Matrix Printer (DMP)

has a handsomely styled case in the familiar Apple colors. It allows for both single sheet and tractor feed printing. It has a rather simple set of controls (see Figure 1). On the front panel one push-button selects between on-line and local modes. The line feed switch, which operates only in local mode, will advance the paper one line whenever it is pushed. If held down, it will advance the paper one line at a time for four lines and then continually advance the paper until the switch is released. For faster advance, the TOF switch will advance the paper to the first line of the next sheet. This button also only works in local mode, and it can be used at power up time to perform a very limited self test function.

Three indicator lamps tell the operator respectively that power is on, that the DMP is in on-line or local mode, and is out of paper. The power switch is on the left side of the case, and a lever on the top left converts from friction to tractor feed. Finally, the platen knob on the far right side of the case completes the physical control features of the DMP.

Figure 2 shows a closeup of the DMP with the paper and carrier covers removed to show the interior. Note the print head which is held in place by two clamps. I have swung one out for illustrative purposes. With the other also swung aside, the head easily lifts out for replacement. It is rated at 100 million characters, but if and when it goes you can easily replace it yourself. One large store chain quotes a current replacement cost of \$140.

Capabilities

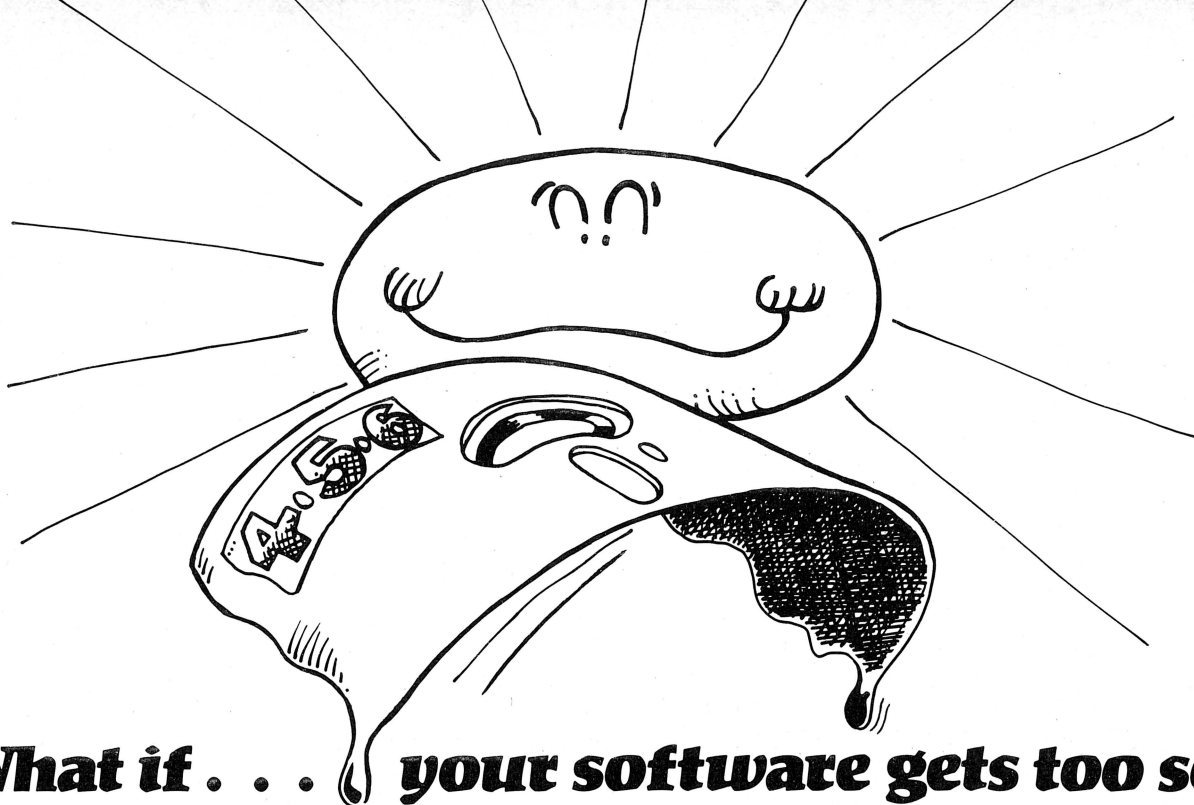
Let's begin by listing some of the more significant features of the DMP.

- Logic seeking dot matrix;
- 120 characters per second and 63 lines per minute at 10 characters per inch;
- Selectable friction or sprocket/pin feed;
- 7-dot horizontal by 8-dot vertical standard characters in an 8 by 9 dot field;
- Full ASCII standard character set plus some foreign language characters;
- 3K character buffer;
- Add up to 175 8-dot by 8-dot or 95 8-dot by 16-dot user defined characters;
- Number of characters per inch settable to 9, 10 (Pica), 12 (Elite), 15, or 17;
- Two proportional-space modes at 160 or 144 dots per inch;
- Set line spacing in increments of 1/144 inch including standard 6 or 8 line per inch formats with both forward and reverse line feeds;
- Unidirectional or bidirectional printing;
- Boldface;
- Underlining;
- Elongated (headline) print;
- Sophisticated tab controls which allow programmed formatting of up to five pages (forms);
- Excellent graphics with 320 dpi horizontally by 144 dpi vertically
- Serial or Parallel versions.

One should not make too much of the "foreign language" feature of the DMP. Essentially, it allows the user to substitute a dozen British, German, French, Italian, Spanish, or Swedish characters for English ones.

Apple DMP Documentation

Apple was in a rush to get to market



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WildCard 2 (formerly The Alaska Card)

Designed by us and produced by Eastside Software, WildCard 2 is the easiest-to-use, most reliable card available. Making backups of your total load software is as easy as pressing the button, inserting a blank disk and hitting the return key twice. WildCard 2 copies 48K, 64K and 128K software, and, unlike other cards, is always ready to go. No preloading software into the card or special, preformatted diskettes are required. Your backups can be run with or without the card in place and can be transferred to hard disks. \$139.95. complete.

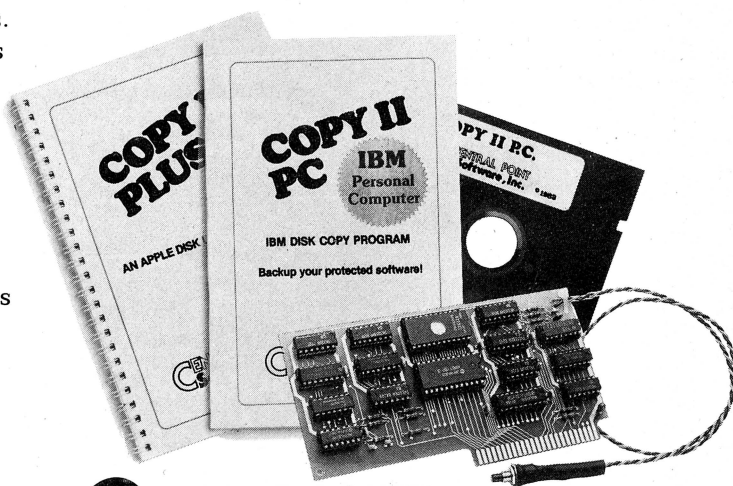
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Copy II PC

This is the only disk backup program for the IBM PC, PC/XT and PCjr that copies almost anything. Others may make similar claims, but in reality, nothing out performs Copy II PC . . . at any price. Copy II PC even includes a disk speed check and is another "best buy" at only \$39.95.

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Figure 1

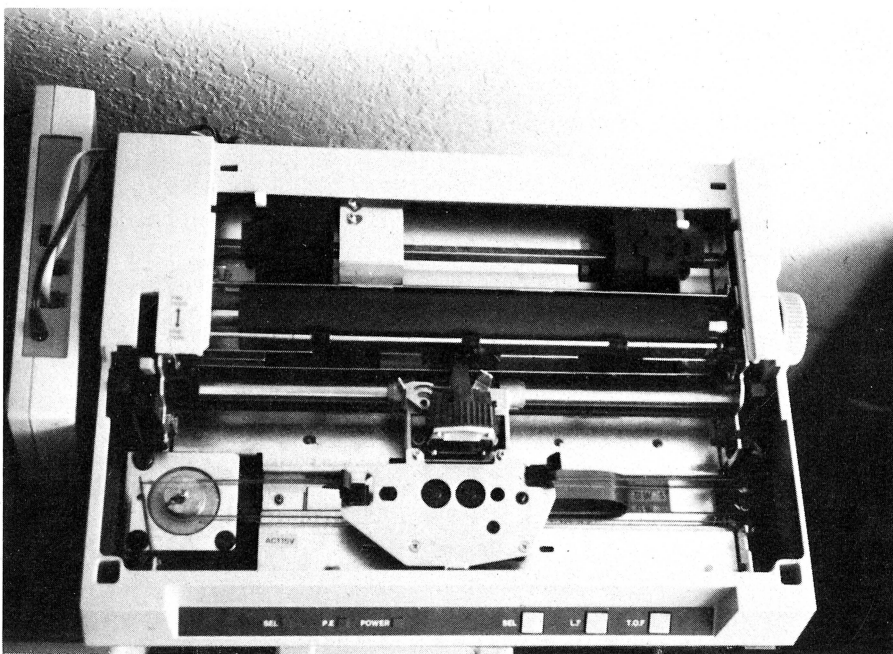


Figure 2

with this product. As a result, the only documentation was an installation manual or "Operator's Guide." It did little more than tell the owner how to physically set up the printer and connect it. They do plan on eventually publishing a user's manual, and I did prevail on them to send me a preliminary draft copy. While still crude, it looks like it will become a good quality document. The one exception is the section on vertical tabbing which I found to be totally incomprehensible. They really need to do some work there before releasing the manual. By the way, Apple Marketing informs me that Apple will furnish early purchasers with copies of the manual. We hope they will go automatically to users who sent in their information and warranty cards. If you didn't send in your card, send a request, along with proof of purchase, to Printers. Apple Computer, 10260 Bandley Drive, Mail Stop 50, Cupertino, CA 95014.

Burtronix I/O Card

Alas for the pocketbook, printers do not work by simply plugging into the nearest wall socket and throwing the on/off switch. One also needs to purchase an interface card and possibly a connector and/or a cable. Since I purchased the parallel version of the DMP, I was faced with the additional purchase of a parallel interface card. Apple sells an Apple /// Universal Parallel Interface card, but I wanted to also have graphics printing capability.

While wandering through the mob scene at this spring's West Coast Computer Faire, I came across a booth run by a company that I had never heard of called Burtronix. They had a product called, Printercard ///, that was doing great things interfacing between an Apple /// and an IDS Prism color printer. After they assured me that their product also supported the Apple DMP, I decided to take a chance, and I gave them a check. To my pleasant surprise, the card arrived by UPS one week later. Also to my pleasant surprise, it came with a long interface cable that allows for real flexibility in the placement of the printer. However, to my not so pleasant surprise, the printer end of the cable terminated in an invisible connector. Well, I know that the printer manufacturers have never standardized on their connectors, and I realize that Burtronix can't read all of their customers' minds, but chasing around to electronics stores certainly ruined the first sunny weekend we had enjoyed in California in months.

Now that we have purchased the connector, attached it to the cable, hooked it between the computer and the printer,

and turned everything on, we're ready to start printing, right? Well... actually not. As you Sophisticated Operating System users may know, SOS gains much of its power from a shell structure which provides device independence to your application programs. This is principally accomplished by the software drivers located in the SOS.DRIVER file on your disks. Burtronics supplies the appropriate printer driver software on a disk along with excellent instructions on how to install it in the SOS.DRIVER file. Once the driver has been installed, we are finally ready to use the printer.

Capabilities

The Printercard /// is a Centronics-compatible parallel interface and character device driver which gives you full text access to your printer. In addition, it provides some outstanding graphics capabilities:

- Black and white dumps of any of the four Apple /// graphics modes;
- 16-color dumps using IDS Prism printers with color ribbons;
- Independent horizontal and vertical magnifications for single, double, or triple size dumps;

- Picture cropping to show only part of the screen;
- Two types of double buffer dumps for larger pictures;
- Rotate image 90 degrees either left or right;
- Invert black and white for negative image dumps;
- Dual density images (Epson MX printers only);
- Position the image anywhere on the page;
- Uses logic seeking for fast dump execution;
- Abort-dump key for stopping a screen dump.

The Printercard /// also includes dip-switch selectable automatic form-feed and line-feed along with user definable top-of-form title messages and printer initialization messages. The card also employs interrupt driven print spooling with a user-variable timeout loop which allows modest improvement in throughput during printout (it is not at all like having a true bulk memory print spooler) and allows for individual selection and configuration of the interface control

lines. The Printercard /// hardware/software combination is fully compatible with Apple /// SOS, Apple Business Basic PGRAPH utility program, and the CP/M graphics utility programs. Currently, Burtronix supports the Epson MX and IDS PRISM printers in addition to the Apple DMP with more printers promised in the future.

Printercard /// Documentation

The history of this industry (that sounds rather pretentious for something that has only been around for a half dozen years) shows that new companies can often generate first class products which are typically accompanied by little or worse than little documentation. As we noted above, that's true of large companies as well as small ones. I almost gave up on buying the card when the salesman told me it was only accompanied by "preliminary documentation." Sure enough, the owner's manual consisted of 90-plus Xeroxed pages neatly stapled together. To my astonished delight, the manual was both comprehensive and comprehensible. I already mentioned the SOS driver installation. I had never done that before, but it led me straight through the

APPLE A2M0058/A2M0059 PRINT SAMPLE.

NO. 229450

pica characters

!"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN O PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

elite characters

!"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN O PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

condensed characters

!"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN O PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

proportional characters

!"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN O PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

72 dots/inch characters

!"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN O PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu vwxyz{|}~

120 dots/inch characters

!"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN O PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

proportional characters (144 dots/inch)

!"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN O PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

Table 1

task without any dead ends. A total computer neophyte might still be better off letting the dealer perform the total system integration, but most people can handle the task with the aid of the manual. Burtronix also garnished the package with a nice demonstration disk. They have also promised to send the final spiral bound manuals to all the owners.

Summary

I am really sold on this combination of products. The print quality is excellent for printers in this price range. Table 1 shows the actual factory test results for my printer. If you have ever seen a hard copy of Lisa graphics as generated by the Apple DMP, then you can appreciate the excellent graphics capability of this printer. The Burtronix card only supports the Apple /// graphics capabilities; so don't expect Lisa-quality output. However, the PrinterCard /// does an outstanding job of transferring the Hi-Res screen to paper. Figure 3 shows a sample Hi-Res printout of Apple /// Business Graphics output. Two horizontal modes are shown; normal, and 2x vertical magnification. Also shown is a printout which was rotated 90 degrees.

These images didn't come easily. The original software graphics driver had a small error that badly messed up the images on the DMP. The Burtronix folks were wonderfully co-operative and quickly found the glitch. I trust that they will supply corrected versions to other DMP users who experience graphics problems.

What about those other Apple DMP "imitations" by C. Itoh and DEC? (Readers of this magazine will, I hope, forgive my Apple-centered view of the universe.) As noted earlier, they are mechanically identical under their high-impact skins, but they each have unique electronics driving them. Side-by-side testing was not possible, but evidence indicates that the Apple DMP compares favorably with the C. Itoh version. The Apple PROMs solved a dot alignment "stitching" problem in the C. Itoh graphics. Apple allows up to 100 ESC sequences per text line; C. Itoh allows 6. Finally, while both units trigger graphics with ESC-S, Apple can also trigger graphics with ESC-G.

No reviewer can get through a review without a gripe or two (it's in our Union contract). So, let me voice two complaints. Apple is no longer a garage shop operation, and we can hold them to high standards. They owe their customers high quality documentation support to go along with their excellent hardware. In all fairness, Apple was a leader in establishing high documentation standards in

the industry, but they let us down this time by releasing this product without a real manual. Better late than never, and it is being supplied.

Also, I am less than thrilled with the automatic form feed feature on the PrinterCard ///. As implemented, it has a dip-switch on/off control on the card. With the switch on, the printer receives a form feed instruction after a number of lines determined by a parameter in the SOS Driver file. This can lead to paper whizzing thru the printer if your application program also insists on sending form feeds. I felt a little like the sorcerer's apprentice when I first tried to get a hard copy of this article using Applewriter ///. I recommend most users turn off this feature on the card.

I want to finish this article by closing the loop back on the leading paragraph. Most of you know that Apple has a Z-80 CP/M card available for the Apple ///. Many of you may also know that this product was originally developed by Microsoft (talk about high technology canneries!). But, how many of you know that Microsoft commissioned Burtronix to actually design that card for them?

Burtronix has sold the card to a larger label, Rana Systems. What the effect of that will be is not yet fully known, but the change should be technically transparent to PrinterCard /// owners. Manuals, packaging, etc. may be delayed. Such is life in Cannery Row.

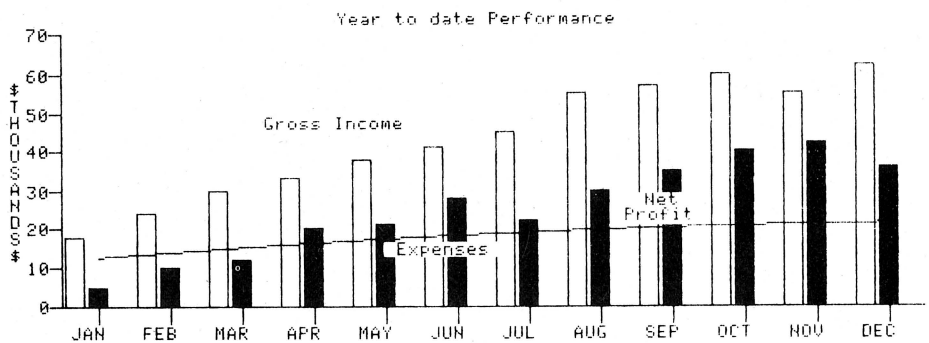


Figure 3a

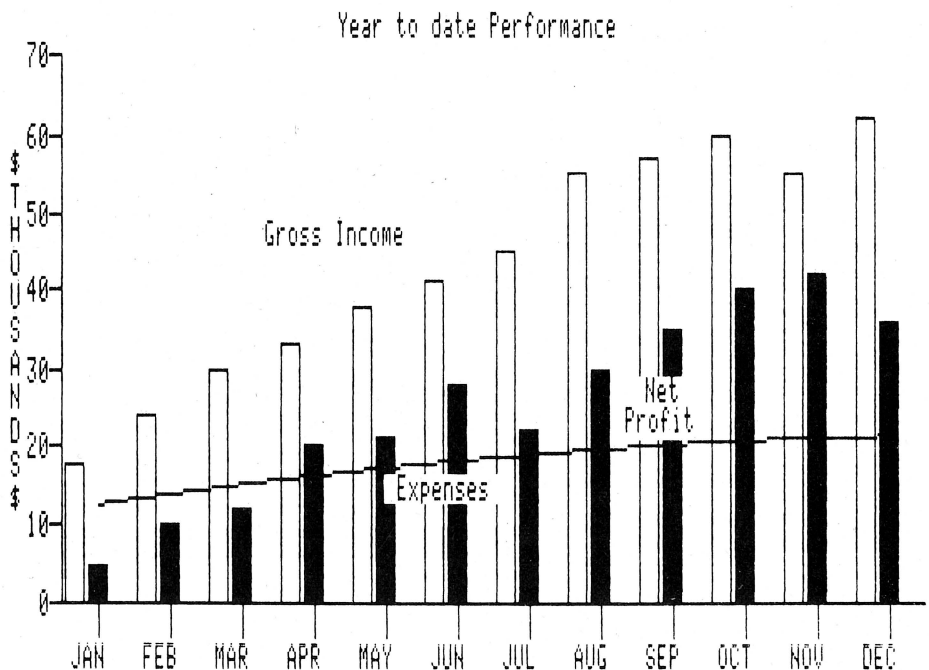
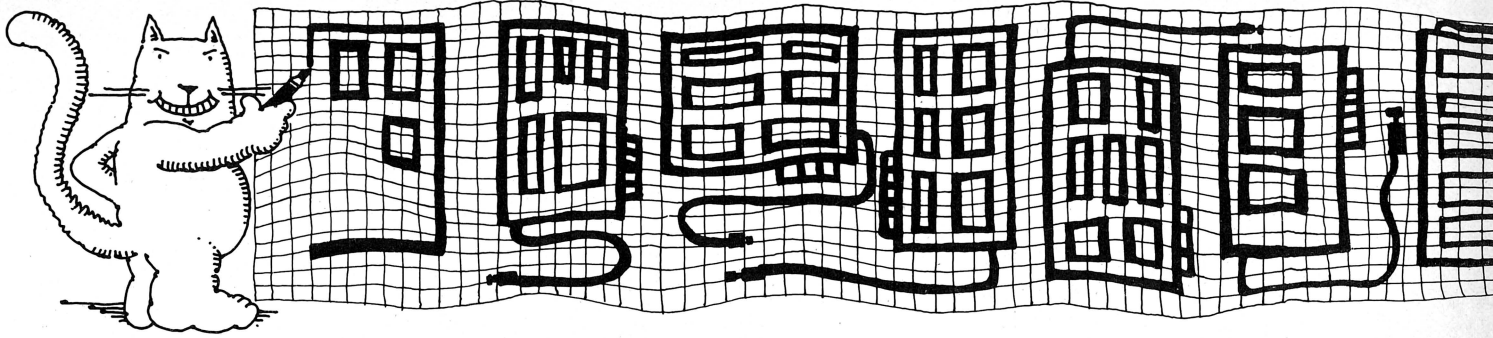


Figure 3b



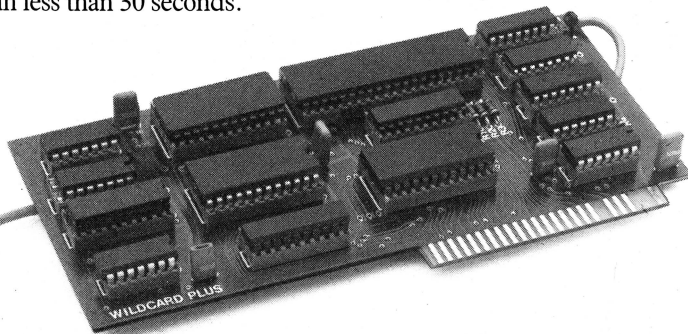
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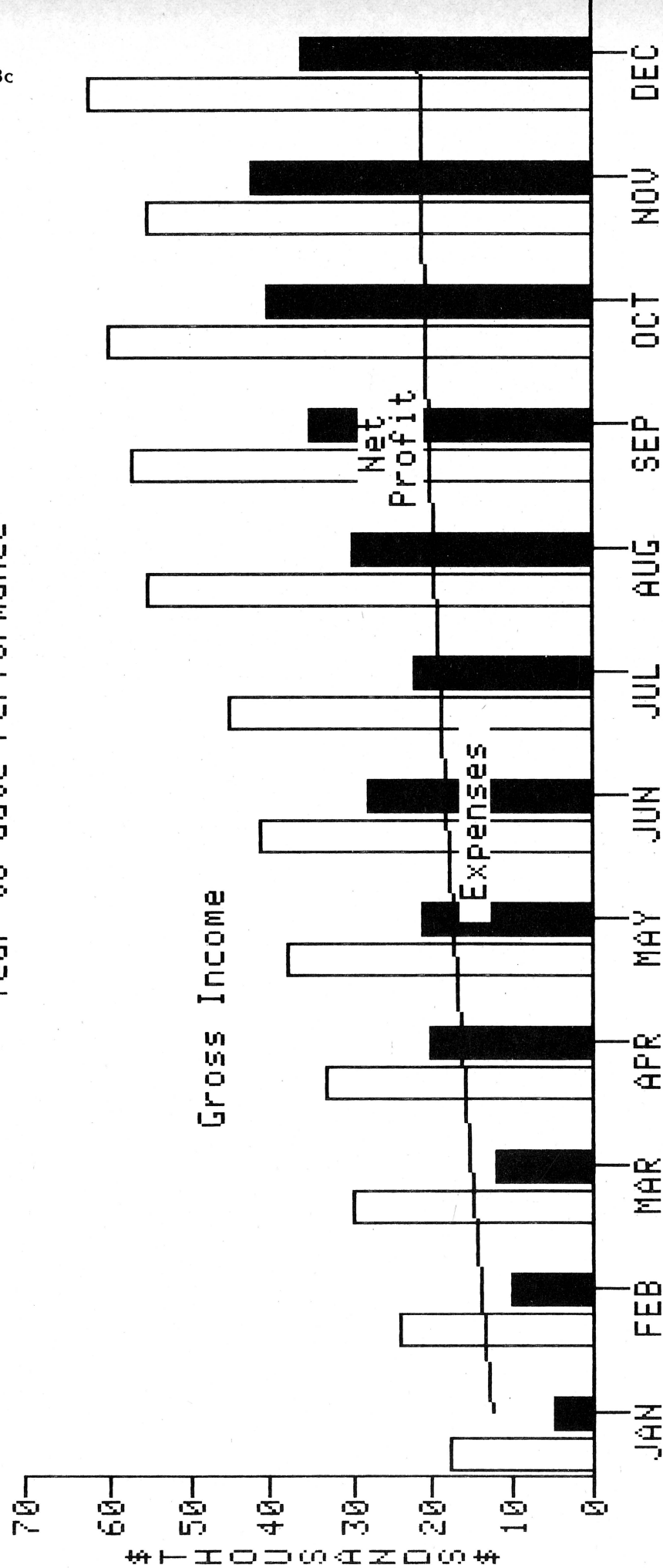
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Figure 3c

Year to date Performance

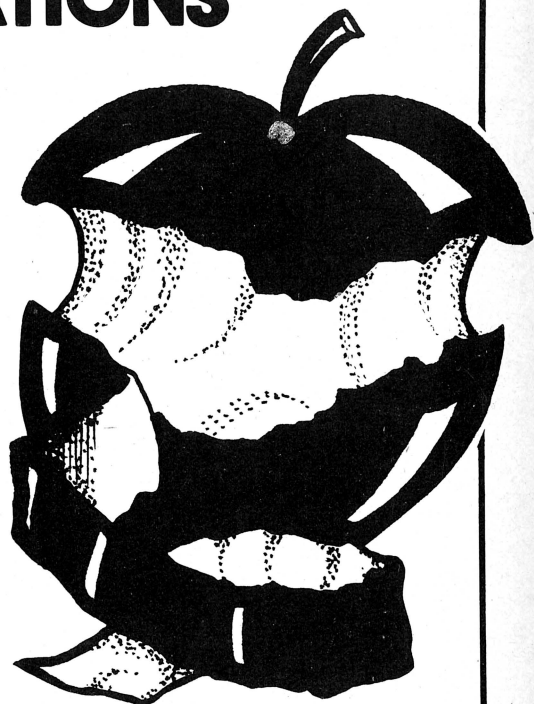


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- Sorting
- Random Access Of Variable Length Records

Flexibase lets you build and access data base files in a language that you already know. You can use Flexibase with Applesoft, Integer Basic, Fortran, Pascal, or whatever language you use on your Apple. Flexibase is a card that you plug into a peripheral slot on your apple. It'll let you write application programs you never dreamed possible before. Or, you can select one of our application programs that use Flexibase. Each comes on a separate 5¼ inch floppy disc and sells for just \$42.50 each. Flexibase must be installed before using our application programs.



WHAT IS A DATA BASE?

A Data Base is a special organization of your Data files using "Keys." You can read your files either sequentially or randomly. For example if your file key was by name, reading your file sequentially would produce records alphabetically by name (regardless of the order you wrote the records in). Or you could read the file randomly to find a specific name without searching the whole file. Examples of keys: Social Security number, name, (payroll) bar code, stock number, (inventory) name, company, zip, (mailing) purchase order or account (accounts receivable and payable). The file can be read by either of two keys. Variable length records eliminate extra spaces used to make the records all the same length.

- Sorts by two keys
- Duplicate keys allowed
- Copy with standard utility
- Read sequentially
- One or more disc drives
- No new language to learn
- Read randomly
- Mix Apple and Flexibase files on the same disc

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Flexibase and all application programs come complete with instruction manual.
Flexibase runs on Apple II, Apple II Plus, and Apple II E.

S.A.M. - Talk Is Cheap

by Neil Lipson and Gary Lipson

There was a time when personal computers couldn't talk. This all changed when speech synthesizers became available to the public. There are many speech synthesizers on the market, but all of them require additional hardware for them to work. All of them, that is, except for a product recently released by Don't Ask Software (yes, that's their name). This software package, called **S.A.M. - The Software Automatic Mouth**, produces quality speech for the Apple without hardware.

The addition of speech to your microcomputer can have limitless uses. For example, where certain individuals cannot look up at a CRT, such as a physician in surgery, or blind individuals, SAM is excellent. The fact that it can speak text files allows for many interesting uses. You can now have your computer speak a word processing file, and you can check for various mistakes or composure in this manner. In addition, you can have the computer speak to you while driving a car. You can have your programs instruct its users vocally or teach a child who cannot read.

It is possible, of course, to call your computer by phone, and without the use of a modem, have the computer give you information. It would take some interfacing into the phone circuitry, but this is done every day. You could, of course, have some kind of security system. Use your imagination, and let us know how you're using the hardware and program.

SAM, as I will refer to it throughout the rest of this article, comes complete with a disk containing SAM, an English to speech conversion program, a testing program, and demo programs. SAM also includes a D/A (digital to analog) converter board. This is a simple card which takes SAM's speech and converts it to a clear, pleasant sound which is then output to an external speaker, which the purchaser must provide. The card can be placed in any slot. A simple four inch speaker works very well with SAM. You can also use the external speaker to replace the smaller speaker inside your computer.

SAM allows you to make your computer talk in two different ways. One way is to enter the words you want SAM to say phonetically. This method is the most efficient and produces more accurate speech. You can also have SAM stress certain syllables with this method to better express the true meanings of your sentences. The other method is to enter the words in plain English and have SAM convert them to speech. This method is less accurate and occasionally mispronounces words. The "voice" has a slight foreign accent, but I'm not sure what country.

The two main programs which are included are SAM and the Reciter. SAM is the program which actually makes the computer talk. The Reciter, on the other hand, allows the computer to translate English to speech. I must add that the Reciter is one of the most accurate speech translators I have seen. This can come in handy when the computer is reading something which it does not know of ahead of time (i.e. reading a text file aloud).

It is also very easy to add speech to your own programs. Once SAM is loaded into your computer, all you need to do is define what you want to say in a simple string, and then invoke SAM by calling a particular address. Both methods of speech entry are capable of use from BASIC and machine language.

Another feature which distinguishes SAM from other speech synthesizers is the control the user has of SAM's voice. The user can not only control the pitch and speed with which the computer speaks, but also the size of its mouth and throat. This allows the user to make SAM sound like almost anything imaginable (even E.T.)!

Control of these variables is very easy. Simple POKE and CALL statements allow the user to change each of the four voice-altering options. Several examples of this feature are provided for the user to explore.

SAM is a machine language program which takes up 9K of memory. A recently added feature allows SAM to be loaded into a language card, if desired. The additional Reciter program takes up about 6K. This program, however, can not fit on the language card and is placed much higher in memory so that it will not interfere with Hi-Res Page two (this problem can occur if the language card version is not used).

The one limitation put on the user is that SAM can only operate on a computer with the D/A card installed. This means that you are basically limited to use of SAM on your own computer.

SAM comes with a well written instruction manual which teaches the user how to use SAM and all the accompanying software. Complete memory maps and important memory addresses are provided for the more advanced programmers. Also, a dictionary of about 1500 words spelled phonetically is provided to help the user become acquainted with phonetic spelling. This is not very difficult, and with a little practice can become second nature.

Overall, SAM is a fine product at a very affordable price and is an enhancement to any computer user's library. You won't be able to stop talking about it.

The unit can be purchased from:
Don't Ask Computer Software
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Circle HelpCard No. 40

Motherhood, Voodoo and the Gray Market

by Steve Goldman

Because I bought an Apple II Plus personal computer, I will never again have blind faith in motherhood or apple pie - only in the flag.

Several months ago, I purchased an Apple II Plus through the "gray market" — the Wall Street Journal's description of mail order stores that secretly buy overstocked merchandise from authorized dealers. With a Ph.D. in electrical engineering, more than 28 years of amateur radio activity, and teenage job experience in the radio/T.V. repair business, I risked a gray market purchase because I believed I wouldn't need the "hand holding" that local Apple dealers provide their retail customers.

When my Apple, disk drives, and printer arrived, I glanced at them, at the stack of manuals, and at my unheld hand. How much easier it would have been to drive to the local store, study the display computers, ask the questions that my purchase entitled me to ask, rush home, and, like a good chimp, mindlessly connect mine the way my local dealer connected his. But with no local dealer sharing the ecstasy of my recent purchase, I did not qualify for such convenience. Instead, for several days, in my spare time, I waded through the instruction manuals, heeded all the warnings, and only then dared connect the Apple, disk drives, printer, and interface cards together and apply power. Somehow, they all seemed to work.

After several weeks of operation, I began to believe that "Life begins at 64K." Instead of being content with my Apple's 48K, I began to fret over the 16K it didn't have. I felt impotent at not being able to try all the programs that require 64K of memory.

At the next meeting of the local Apple users group, I bought a low cost (\$70) language card sold from an itinerant sales representative's lunch bag. I rushed home from the meeting, anxious to plug in the 16K of extra memory and penetrate the universe of 64K programs.

I plugged in the language card, booted my System Master diskette to load the Integer BASIC required for some of these

64K programs, and then played with several of them.

The next day, my son complained that a special program he had painstakingly written and debugged had vanished from his primary and backup diskettes. Every time he tried to fetch it, the Apple beeped and the monitor displayed "I/O ERROR."

After verifying his complaint, I discovered that my word processor could no longer write to disk to store records of my keyboard flailings. Convinced that a product named after "apple pie" must be blameless, I accused my recently purchased 16K language card, turned off my Apple's power, pulled out its plug, and removed the language card. My suspicions were verified: once again my Apple could write to disk.

I returned that 16K language card for a refund.

Several weeks later, I purchased another bargain language card (\$64) at a computer show; this time, I couldn't even boot my System Master diskette. Each time I tried, my Apple beeped and the monitor displayed "I/O ERROR."

The next day, I called its makers and asked to exchange the card. They agreed, sent me a replacement, and tested the card I returned, which they later claimed worked perfectly. However, the card they sent me didn't work perfectly. It mimicked its predecessor, beeping and displaying "I/O ERROR" when I tried to load my System Master diskette.

A friend who had recently purchased an Apple II Plus with an Apple Language Card from an authorized Apple dealer let me try my card in his Apple. It worked. Then I tried his Apple Language Card in my Apple. It also worked.

I didn't need a Ph.D. in engineering to know that witchcraft still lived. It was obvious that the authorized Apple dealers were practicing "micro-voodoo" on "gray market" Apples that dared mate with non-Apple language cards. Somehow my unauthorized Apple was genetically defective, unable to use memory that authorized Apples used with ease.

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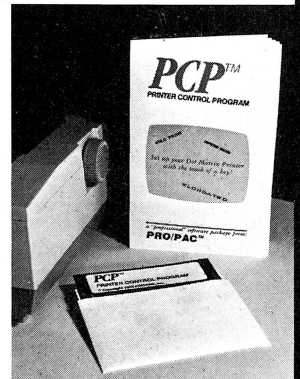
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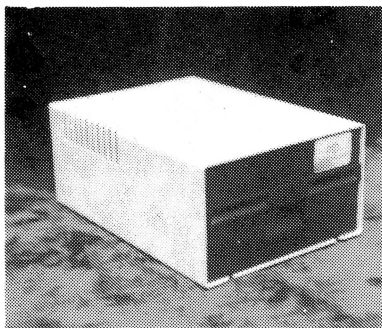
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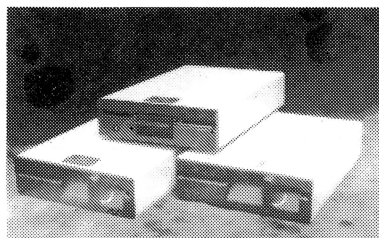
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Circle HelpCard No. 31

January 1984 **71**

Since an Apple Language Card worked in my Apple, the problem couldn't be in my Apple. And since my language card worked in my friend's Apple, the problem wasn't in my \$64 card. The problem must be in their mating.

Obviously, my friend's authorized Apple must be a smoothie that could coax any bargain priced card to perform, while my unauthorized Apple was a clod, which could only coax cooperation from a high priced (\$200) Apple Language Card.

Next, before I returned my \$64 language card, my local authorized Apple dealer held a sale on Microsoft Language Cards. I bought one, only to discover that my Apple was not intimidated by brand names other than "Apple": it again replied "I/O ERROR" when I tried to load my System Master Diskette.

Finally, I began to doubt even apple pie. Certainly, Microsoft design and quality control practices were every bit as demanding as Apple's.

Perhaps the defect *was* in my Apple.

Perhaps I had unfairly accused the makers of every language card that had seemed to fail me.

Perhaps my Apple was a racist, refusing to cooperate with all language cards of different make, creed, or color.

Perhaps compatibility required more than mateable plugs and sockets with the required voltages and signals. (It does between men and women.)

Whatever the cause, I was sure my Apple was guilty. I took my Apple Computer and Microsoft Card to the local authorized dealer and told him my story. He advised me to leave

everything to him, which I did. (How nice it felt having somebody hold my hand.)

Two days later, the dealer had fixed my Apple by replacing its mother board. What iconoclasm! Not only had my Apple been defective, but its defect had been in the *mother* board. Not only apple pie, but motherhood too had become casualties of my venture into the gray market.

After trying several programs with success, I discovered that my word processor program wouldn't print. I replaced the Microsoft Card with the \$64 bargain card. My word processor printed, and all my other programs seemed to work too. So I returned the Microsoft Card and kept the \$64 bargain card in my Apple.

At last, my Apple and its new mother board work flawlessly. However, having been disappointed by my Apple and its original mother board, I will be somewhat suspicious forever after. Until then, to preserve flawless performance, I will care for and feed my Apple and its new mother board the finest bug-free, dust-free software, until somebody designs and sells a new personal computer with no mother board, no "apple" parts (i.e., apple skins, pits, blemishes, sauce, worms, etc.) and gives it the only name that can inspire even more trust than "apple pie" or "motherhood" — "The Flag."

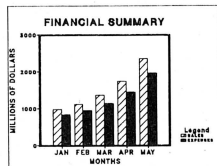
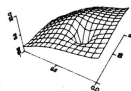


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- Chris Bayha, Portland, OR: "I use it for my rental properties and for my business. It performs beautifully and is a great value."
- Dan Thomas, Elgin, IL: "The program has proved the hype of the Money Street as really too modest. How many programs are there that you can't think of one thing you would do differently?"

One reason for this enthusiasm is that Money Street lets customers do their own books. Keeping records has always been a bother, and an expensive one, especially for small one-person business or the independent professional. But Money Street solves the problem. Here's what Weston Cotten of Highlands, Texas says:

"I am an attorney with several business interests I run out of my office. I use nothing more complex than my checkbook to keep my financial records in shape for tax time. Your program has helped me to be a better record keeper and has allowed me to look forward to tax time with a better outlook."

\$99 For a checkbook program? Money Street isn't cheap, in fact it's one of the more costly checkbook programs. But with software, as with everything else, you get what you pay for:

- Money Street is fast! Example: 9 seconds from boot to data entry. Example: 5 seconds from the main menu to any sub-section. Example: 18 seconds start-up to print time.
- Money Street is easy to use! There are no complex set-ups; no monthly cut off. Gary Rominger of Sacramento, CA wrote: "Your claim of 30 minutes to learn it is fully justified."
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Take farmers, for example: they can treat each crop or herd as a separate profit center. Stan Vasa of Lincoln, NE, says: "I use Money Street to keep my farm records and find the program to be excellent."

Why not get the best? Sure, you can buy a cheap program just as you can buy a cheap clock. But is it really worth it?

Many customers report that "home accounting" programs are difficult to learn, clumsy to use, and obsessed with budgeting; that only Money Street gives the speed, the ease of use, and the many reports needed.

Bill Sampler, Fairfax Station, VA puts it this way: "One way I judge a program's worth is how easy it is to use after you have been away from it for a couple of weeks. Money Street is no problem, it runs like a fine jeweled watch."

So, Money Street pleases customers just as a Porsche pleases drivers. Top quality costs more; that's a fact of life. But isn't quality always worth it?

One of our customers, Buzz Bruggerman of Orlando, FL said: "We use Money Street in our law office. We figure it's not the cost of the program that's important, but how much time it takes to set it up, learn it, and run it. Money Street's a breeze."

How it works. On your computer screen, you create a facsimile of your checkbook. You see 17 items per screen, and can scroll for more. As the computer balances your checking account, you give each check or deposit its own category code.

--- ENTER ITEMS/BALANCE CHECKBOOK

#	MO/DA PAYEE	CODE	AMOUNT
101	01/01 WM JONES	01	300.00
102	01/01 ANY WATER CO.	02	50.00
103	01/01 ANY POWER CO.	04	25.00
104	01/01 ANY GAS CO.	03	50.00
105	01/12 SHELL OIL CO.	10	100.00
106	01/13 STATE FARM INS.	11	100.00
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108	02/01 WM JONES	01	300.00
109	02/01 ANY POWER CO.	04	50.00
110	02/01 ANY WATER CO.	02	50.00
111	02/12 SHELL OIL CO.	10	50.00
D	02/12 W. SMITH	20	1000.00
D	02/25 J. DOE	21	1000.00
DEBIT	02/27 PURCHASE CHECKS	99	25.00
112	02/28 STATE FARM INS.	11	50.00
113	02/28 STATE FARM INS.	05	100.00
114	02/28 JONES COMPANY	05	1000.00
ENTRY #0018			BALANCE 1550.00
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ENTR	FILED	CHK #	MO/DA PAYEE	CODE	DESCRIPTION	AMOUNT	TOTAL
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0005	04/05	104	02/07 JMT FEB RENT	01/RENT	123 MAIN ST.	-100.00	-200.00
0006	02/27	107	03/04 JMT MARCH RENT	01/RENT	123 MAIN ST.	-100.00	-300.00
0002	04/05	102	01/01 CITY POWER CORP	02/POWER	123 MAIN ST.	-50.00	-50.00
0004	02/27	D	01/03 REFUND	02/POWER	123 MAIN ST.	10.00	-40.00
0009	04/05	108	03/04 CITY POWER CORP	02/POWER	123 MAIN ST.	-50.00	-90.00
0003	02/27	103	01/01 COUNTY WATER CO	03/WATER	123 MAIN ST.	-25.00	-25.00
0007	04/05	106	02/07 COUNTY WATER CO	03/WATER	123 MAIN ST.	-30.00	-55.00
0010	04/05	109	03/04 COUNTY WATER CO	03/WATER	123 MAIN ST.	-30.00	-85.00
04/TOTAL 123 MAIN ST						-525.00	
0014	04/05	D	01/17 JOHN'S WAIVES	05/JOHN'S	WAIVES/ICCW	1200.00	1200.00
0013	02/27	D	02/16 JOHN'S WAIVES	05/JOHN'S	WAIVES/ICCW	1200.00	2400.00
0011	04/05	D	03/04 FEES/ SUN CORP	05/JOHN'S	WAIVES/ICCW	1000.00	3400.00
0015	04/05	D	03/17 JOHN'S WAIVES	05/JOHN'S	WAIVES/ICCW	1200.00	4600.00
0012	02/27	D	01/17 DIVIDENDS IBM	06/INVESTMENT	INCOME	1200.00	1200.00
0016	04/05	D	02/17 DIVIDENDS REPRD	06/INVESTMENT	INCOME	50.00	1250.00
0017	04/05	110	03/15 OVERPAYMENT IBM	06/INVESTMENT	INCOME	-10.00	1240.00
07/TOTAL INCOME						5840.00	
08/NET						3315.00	
0018	UNCLD	111	02/18 JN SMITH MD	09/MEDICAL	EXPENSES	-100.00	-100.00
0019	UNCLD	112	02/19 MC JONES DDS	09/MEDICAL	EXPENSES	-150.00	-250.00
0020	UNCLD	113	02/20 LAKE HOSPITAL	09/MEDICAL	EXPENSES	-200.00	-450.00
0023	04/05	115	02/30 JOHN SMITH	10/INTEREST	EXPENSES	-100.00	-550.00
0022	UNCLD	114	02/30 VISA INTEREST	10/INTEREST	EXPENSES	-17.90	-567.90
11/TOTAL DEDUCTIONS						-567.90	

15 Ready-to-print reports! Press four keys and the program will print any of 15 different reports. Just select from the Report Menu, and the program does the rest. Start-up to print time is usually 20 seconds. Reports include:

- Monthly code totals • To-date code totals • Sort by amount • List code dictionary • Sort by payee • List deposits • List uncleared checks • List uncleared deposits • List all entries • Sort by date cleared • Print check registry • Print selected month • Print selected code • List code totals • List monthly totals

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Money Street includes Program Map, complete documentation, on-screen demo, plus tutorial. For Apple® II, II+, IIe, III emulation, and Apple look-alikes. Requires 3.3 DOS, 48K. Money Street works with one drive, but two are preferred. It's also okay without a printer, but you'll miss a few reports. Master Charge, Visa, COD okay. Add \$2.50 on all orders for postage and packing. To order or get additional information: call 24 hours and leave your name with our answering machine.

The program is copy protected. We sell back-up disks for \$10. We also offer a special utility disk that makes two back-up copies, makes quick copies of data disks, and allows fast sorts of selected months or code categories. Price is \$25.

Computer Tax Service
P.O. Box 7915
Incline Village, NV 89450
(702) 832-1001

\$99⁹⁵

Money Street is a Trade Mark of Bullseye Software. Apple is a registered trade mark of Apple Computers, Inc.

Dealer: Write or call for price list.

The New Stuff

New Products For The Apple

Edited by
Mark L. Crosby

Producers of products for Apple Computers should send news releases two months in advance:

NEW PRODUCTS EDITOR

Apple Orchard
908 George St.
Santa Clara, CA 95050

The IAC cannot be held responsible for claims made by manufacturers.

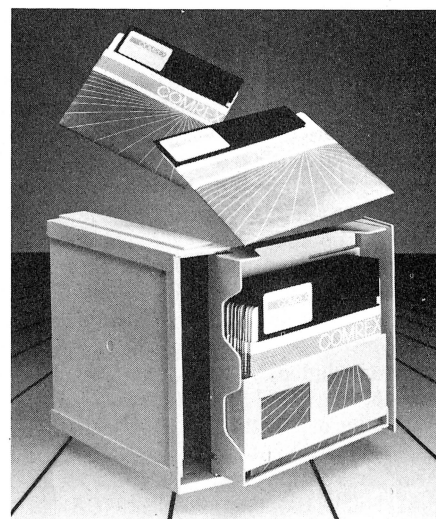
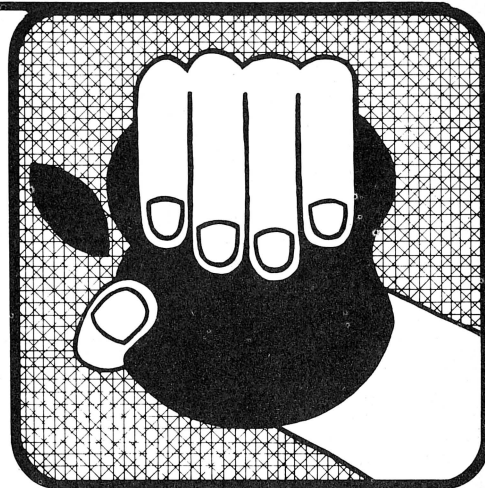
The most comprehensive listing and description of new temptations, delicacies, and necessities for your Apple. Notice too that we've made it even easier for you to find out more about these items; just circle the corresponding number on the Apple Orchard Direct Help Card a bit farther ahead in this issue. We'll forward the requests directly to the manufacturer.

HARDWARE

Disk Storage

New **Comrex** diskettes are available in three popular capacities, providing users the flexibility of choosing the exact storage density and surfaces they need. Packaged 10 to a box. Model CR-10005 is a diskette that records on a single disk surface and single density for \$29.95. Model CR-10010 offers single-sided, double-density recording for \$44.95. Model CR-10015 features double-sided, double-density recording for \$49.95. These standard diskettes have a 5-year guarantee. A premium diskette, Model CR-10020 features double-sided, double-density recording and a lifetime guarantee \$59.95 includes a plastic box. All are configured with a soft-sectored format, a single index hole, 48-track per inch density and 40 tracks for each recording surface. At your local dealer.

Circle HelpCard No. 101
Comrex International, Inc.
3701 Skypark Drive
Torrance, CA 90505
(213) 373-0280



Apple **add-on half-height drives** provide a big 160K bytes of dual density storage running either DOS 3.2 or 3.3. Contemporary slim line styling, cooling louvers, auto eject of diskette for operator convenience, a unique quick-release controller cable, and a fast 12 milliseconds head access time. 8000 hours MTBF (mean time between failure) is one of the highest reliability factors in the industry. The first drive comes with software, controller card, cable and a complete instruction manual. The second drive, priced lower than the first, comes with cable and instruction manual.

Circle HelpCard No. 102
WTI Computer & Peripheral Products
1530 South Sinclair
Anaheim, CA 92806
(714) 978-9820

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Languages (Programming)

Music

Personal

Utilities

Word Processing

BOOKS/CATALOGS

MISCELLANEOUS

Input/Output

The **Micromodem //e** allows your computer to communicate with any Bell-104 type modem over ordinary telephone lines at 110 or 300 bits per second. It installs easily in an expansion slot, and requires no outside power source. Connects directly to either a single or multiline modular phone jack, to perform both Touch-Tone and pulse dialing. It dials, answers and disconnects calls automatically, and operates in full or half duplex. A built-in speaker lets you monitor your calls when dialing. Smartcom I companion software provides effortless communications. It will guide you through a few easy steps to answer questions to tailor the program to your particular needs. Menu selections let you easily make a call, end a call, or answer a call. Answers automatically - even if you're not there. Stores three of your most frequently called telephone numbers and one prefix.

Circle HelpCard No. 103

Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Blvd.
Norcross, GA 30092
(404) 449-8791

The **Color-I Monitor** is designed to perform superbly with your Apple II personal computer and others. It accepts a composite video signal to produce vivid, richly colored graphic and sharp text displays. Very reasonably priced, the Color-I is a giant step above home TV sets and other monitors. Features 260(h) x 300(v) line resolution, Highly styled cabinet, built-in speaker and audio amplifier, front mounted controls for easy adjustment, interface cable included.

Circle HelpCard No. 104

Amdek Corporation
2201 Lively Blvd.
Elk Grove Village, IL 60007
(312) 364-1180; (714) 662-3949 (CA); (817) 498-2334 (TX)

The new **ShuffleBuffer** from Interactive Structures features random access printing. It can perform mix and merge printout operations previously available only by using expensive software, or scissors and paste. The universal device is compatible with all microcomputers having a standard serial or parallel output port. ShuffleBuffer has the capability to "shuffle" text, graphics, spreadsheet information and other computer-generated material into any desired combination for printing, plotting or telephone transmission. Applications include mailing lists, letter mergings, preparation of personalized form letters and other repeated or rearranged material. Two modes of operation are available: standard "dumb buffer" function of first in, first out printing, and bypass, to interrupt a long printout in

order to produce a separate document on an immediate basis. ShuffleBuffer is an enhanced version of Interactive Structures' Pipeline. Featuring front panel controls to permit stacking, it is slim enough to fit beneath a disk drive unit. It comes with its own cables, power source, user's manual and one year warranty.

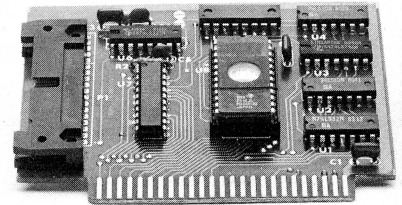
Circle HelpCard No. 105
Interactive Structures, Inc.
146 Montgomery Avenue
Bala Cynwyd, PA 19004
(215) 667-1713



available, with others available soon. The firmware is compatible with Apple Logo, Pascal, and BASIC under Applesoft and CP/M. Complete with a 36 inch cable, User's Manual and one year warranty \$139.00. Also features Apple Silentyte emulation mode and variable line widths which can be set from 40 to 255 columns.

Circle HelpCard No. 107

Techport, Inc.
8120 Penn Avenue South, Suite 114
Minneapolis, MN 55431
(612) 888-5793



Memory

The **Know-Drive** is the smartest 128K memory card for the Apple II and //e. Completely compatible with 128K slot independent cards from Saturn Systems, Legend Industries, Prometheus, Omega MicroWare, etc., using multi bank switching modes. Write protect hardswitch on the card allows you the same flexibility as the write protect tab on a diskette. Know-DOS software enables use of the card as a disk drive simulator. Source code has been included on disk for all machine language drivers so that you may have full use of the card, or in case you wish to modify the drivers for any particular applications specific to you. A piggy-back option will allow the existing card to be changed into a 512K single slot memory card (this option is not yet economically feasible since new 256K RAMs are very expensive). Play-Back remote option offers reset vector RAM/ROM plus via NMI: interrupting, analyzing/modifying, and saving all memory to disk \$39.00. The price of the Know-Drive is \$335.00.

Circle HelpCard No. 108

ABACUS Enterprises
P. O. Box 1836
Detroit, MI 48231
(313) 524-2444

Neptune extended 80-column card gives you increased video display and up to 192K memory using just one slot in your Apple //e. Designed expressly for the auxiliary slot of the //e, the Neptune is available with 64K, 128K or 192K of RAM memory which can be utilized as a solid state RAM disk. VC-Expand/80 software supplied with each Neptune expands VisiCalc up to 220K of workspace memory and provides many other VisiCalc enhancements. DOS, Pascal and CP/M Pseudo-Disk patches and a DOS relocation pro-

Interface Cards

Apple II Ethernet interface allows information to be transferred between an Apple II and other devices on a Local Area Network. This is useful for applications with several computers in one facility. Using this interface, the LAN allows separation in excess of 4,000 feet with only a single interconnecting coax. The design of the interface is compatible with the Ethernet specification for Levels I and II. This allows connecting computers and using existing software and changing or adding only the driver for this interface. For those users that do not have software, a file transfer program can be supplied. Meets IEEE 802.3 Specification for Local Area Networks. Features 8 Kb of RAM Data Buffer, 4 Kb of dual ported RAM in Apple address space. Requires only one Apple card slot. Data is transferred at a full 10 megabits per second using the latest Ethernet LSI integrated circuits. Other Ethernet products include a printer interface, transceiver, cabling and connectors.

Circle HelpCard No. 106

En-Link
4706 Bond
Shawnee, KS 66203
(913) 268-6066

Paragraph-I parallel graphic printer interface card will work in any Apple II and look alike computers. It will enable the user to perform the most needed graphic functions of 90 degree image rotation, double size and inverse print. The card is Centronics compatible for fast data transfer to printers, x-y plotters, d/a converters and paper tape punches. Firmware for Epson, Gemini, Panasonic, C. Itoh, NEC and Apple dot matrix printers is currently

WHERE TO SELL SOFTWARE

1984 PROGRAMMER'S MARKET

Inside information on
500 microcomputer software publishers
who use freelance material —

- what they need
- how to sell to them
- how much they pay

1984 Programmer's Market
Edited by Brad M. McGehee

Everyone who buys or uses a personal computer—no matter what make or model—is a potential customer for this brand new directory of over 500 listings of software and arcade game publishers, and computer magazines buying freelance software. Each listing gives the contact name/address, submission requirements, pay rates, and tips for breaking into the freelance software market.

Programmer's Market also includes five helpful articles on selling programs—how to:

- **prepare a query letter and proposal package for submission**
- **write user manuals to accompany software**

- **document programs**
- **write easy-to-use software**
- **write game programs that sell**

Three indexes help freelance programmers find the best prospects for selling their software—by type of computer, type of software published, and alphabetical order.

The price is right, so get your share of the sales! 300 pages/\$16.95, paper.

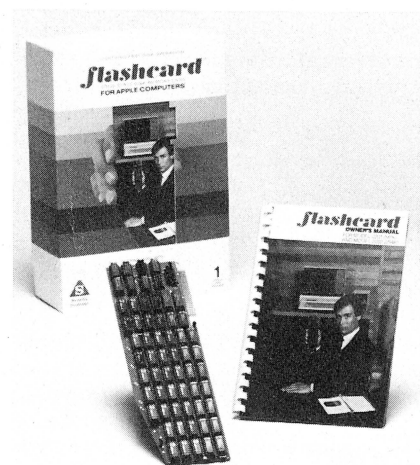
Order today from: Writer's Digest Books,
9933 Alliance Road, Cincinnati, Ohio
45242 by calling 1-800-543-4644 (In
Ohio, Alaska, Hawaii call 513-984-0717).

gram are also included with each card.
Circle HelpCard No. 109
 Titan Technologies, Inc. (formerly Saturn Systems)
 P. O. Box 8050
 Ann Arbor, MI 48107
 (313) 973-8422

The **Flashcard disk emulator** brings the speed of solid state memory to Apple computers for faster program execution. The combination of the Flashcard plug-in board from Syntex, Inc. and MagiCalc software will typically speed up processing time by 1000% over using a standard Apple floppy with an average spreadsheet program. The Flashcard solid state disk displays data instantly, eliminating the nuisance of floppy disk waiting as well as the noisy chatter of disk search. Includes operating diskettes for DOS, CP/M and Pascal for compatibility with programs such as WordStar, dBase II and other popular brands. For CP/M programs, the Flashcard can be configured to emulate a 256K 8-inch floppy disk. Plugs into any Apple expansion slot; the user simply copies a program diskette on the Flashcard which, in turn, reacts as a disk drive, only faster, quieter, and more reliable \$349 (147K capacity) \$529 (294K capacity).

Circle HelpCard No. 110

Syntex Inc.
 15050 N.E. 95th
 Redmond, WA 98052
 (800) 426-7412 (206) 881-7110 (WA)



Printers/Plotters

Finger Print immediately upgrades printers by easing access to print functions such as compressed, italic or emphasized. Available for the Epson MX-80/100, FX-80/100 and RX-80 printers. It is a plug-in module that puts numerous print modes at user's fingertips. Users can instantly select from a variety of print functions by

simply tapping the printer's panel buttons. The increased capabilities do not interfere with normal printer operations. No longer will you need to send special control codes to the printer. Functions include: Compressed, Double-wide, Emphasized, Double-strike, Perforations Skip-over, Left Margin Indent, 8 lines/inch, Italics, Fine Print, and Buffer Clear. Finger Print even allows hundreds of combinations of these and additional functions. Installs easily without soldering. Complete with operating instructions, control panel reference label and warranted for one full year \$59.95.

Circle HelpCard No. 111

Dresselhaus Computer Products
 837 E. Alosta Avenue
 Glendora, CA 91740
 (213) 914-5831

The new **Epson RX-80 printer** offers 128 different typestyles with a resolution so sharp you have to look twice to make sure it's dot matrix. You get bidirectional printing, logic seeking, and a speed of 100 characters per second. And you even get programmable forms control, graphics, and a special quiet mode to keep the noise down.

Circle HelpCard No. 112

Epson America, Inc.
 3415 Kashiwa Street
 Torrance, CA 90505
 (800) 421-5426; (213) 539-9140 (CA)

The **Strobe 260** is the first **eight-pen plotter** and software package available for under \$1000. With just a few keystrokes on your computer, the system produces superb high-resolution charts, drawings and transparencies with up to eight automated color breaks. The even more economical Model 200 produces the same wide range of graphics with a single pen which may be changed manually. The new plotters interface with virtually every popular microcomputer made today, including the Apple II, //e and ///. The StrobeWare software programs provide every graphic format you will probably ever need, including multicolor pie charts, bar graphs, line graphs, text processing, and a broad selection of symbols and character styles.

Circle HelpCard No. 113

Strobe, Inc.
 897 5-A Independence Avenue
 Mountain View, CA 94043
 (415) 969-5130

Nothing makes more sense out of repetitious data than seeing it portrayed graphically. Presentations that use pie charts, solid areas and bar graphs sum up data succinctly, to make an impression that can give you an important edge. For that kind of persuasiveness, **PIXY 3 microplotter** has high resolution graphics that are drawn in increments of 0.1mm. It's faster

at 200 mm per second and plots with three pens automatically. There's also a variety of powerful graphics packages available, all of which produce sophisticated results with ease including BPS, GrafTalk, Graphwriter, and uGraf. With PIXY's versatile intelligence, you can do even more to create the exact graphic you need to present your point with impact.

Circle HelpCard No. 114

Mannesmann Tally
 (800) 447-4700; (800) 322-4400 (IL)
 (417) 661-9783 (Canada)

The **Model 84 eight pen plotter** produces high-resolution presentation quality charts, graphs, and drawings on paper or on overhead transparency film. It plots on either 8 1/2 x 11 inch or A4 paper. The plotter functions with a liquid ink, nylon tip, or ceramicon-tipped pen, according to the demands of the applications. A special business graphics ROM enables the user to plot bar, circular, or line graphs from simple commands. The unit has a plot speed of up to 17.7 inches per second. Resolution is .004 inch. Built-in firmware commands include five line styles, selectable character rotations, special symbols, six different character sets, viewporting/windowing, scaling, and circle/arc generation. The plotter can be used with most micros, minis, and mainframes because it has three interchangeable interfaces: RS-232C, IEEE 488, and Centronics parallel \$1995.

Circle HelpCard No. 115

California Computer Products, Inc.
 2411 West La Palma
 Anaheim, CA 92803
 (714) 821-2011

The **Jett-i ink-jet printer** is priced like a matrix printer. If you're tired of all the noise that's coming out of today's printers, you'll love the quiet of Jett-i. It's an amazingly quiet, versatile, compact and inexpensive ink-jet printer. You can print in normal, compressed, double-height, double-width and boldface type. You can do graphics, pie charts or almost any job you can imagine at up to 110 characters a second with a 1K character buffer.

Circle HelpCard No. 116

Docutel/Olivetti Information Services
 1909 E. Cornell Street
 Peoria, IL 61614
 (800) 447-4700; (800) 447-0890 (AK, HI)

Spirit microprinter lets you do more things yourself. And do each of them letter perfect. It prints standard, bold, expanded and condensed type faces - even italics and finely etched graphics. All because every impression has a crisp, square edge to it for unmistakable clarity. The Quietpak option smothers printer noise. So Spirit rushes through work with barely a whisper. Variable width tractors adjust for narrow jobs like labels or wider jobs like correspondence. All of which are handed

to you immediately thanks to Spirit's Quick Tear edge \$399.

Circle HelpCard No. 117

Mannesmann Tally

(800) 447-4700; (800) 322-4400 (IL)

(417) 661-9783 (Canada)

The **Panasonic intelligent plotter** is a high-speed peripheral that turns business computer graphics into high resolution, full color hard copy. It provides six-color graphics at a fast 16 inches per second, with a choice of fiber, ball point or plastic tip pens in black, red, purple, blue, green and brown. What's more, it has a high level of built-in intelligence that greatly simplifies external programming. With simple commands, you create lines, circles and a full ASCII character set, colorful grids, bar graphs and pie sections. Features an electrostatic paper holding system for secure, high stability plotting. Also has an automatic chart advance option for continuous, unattended plotting. Three interfaces are available: Centronics 8-bit parallel, RS-232C serial and GP-1B.

Circle HelpCard No. 118

Panasonic Industrial Company

Information Systems group

One Panasonic Way

Secaucus, NJ 07094

(201) 348-5337; (312) 981-4824 (IL)

Miscellaneous

Today's home can now receive centralized computer control for up to 256 electrical devices through the unique design of the **HC-1 Home Commander**. It receives simple ASCII instructions through an RS-232 interface, then sends compatible control signals throughout the entire home over the AC house wiring to BSR modules connected to the thermostat, appliances, lighting, etc. It can also be told to send control signals at specific times, in addition to allowing immediate control from the terminal or personal computer. Once programmed, its internal RAM and real-time clock make stand-alone operation possible, leaving your computer free for other functions. It will reliably control every electrical device - even after a power failure - with the security of battery back-up. You can select when devices should go on and off, control the brightness of any light, have your heat turn off after you've left for work, and yet come home to a toasty warm house in the evening. The possibilities are unlimited. Program control examples and complete instructions are included in the package \$195.00.

Circle HelpCard No. 119

Automatic Micro, Inc.

2542 Billingsley Road

Worthington, OH 43085

(614) 766-0670

Cool + Time is a multi-function cooling, power-control, surge protection and clock/timer unit for use on the Apple II and //e. The unit removes heated air from inside the Apple and exhausts it to the rear, rather than across the user's work space. The system is designed to extend life expectancy of Apple computers, which can suffer from heat-load effects due to airflow blockage when accessory cards have been installed. Cool + Time slides easily onto the Apple (and adapts to the Apple Stand), and blends in design and color. The unit features separately switched rear power outlets controlled by two lighted front-panel switches. This provides convenient control of the Apple and monitor, as well as a printer. The unit also protects the entire system with transient power spike suppression circuitry. The real-time and elapsed-time clock/timer accurately displays real time as well as allowing easy tracking of time spent on data bases. The unit carries a one-year warranty \$89.95.

Circle HelpCard No. 120

Tencal, Inc.

9525 De Soto Avenue

Chatsworth, CA 91311

(213) 998-4850



Portable, solid state **uninterruptible power system** ensures that computer operations are not affected by utility gaps, spikes, surges, noise, brownouts or complete outages. Back-up or portable operating time ranges from 5 hours at 25 watts to 1 hour at 100 watts. The self-contained, sealed gel-cell batteries have a life expectancy of 3-4 years and are user replaceable. Input power is switch selectable for either 115 or 230 VAC, 50/60 Hz for worldwide application. Battery energy is monitored continuously by a seven-state LED indicator. The internal charging system is automatically controlled and regulated. A 12 VDC power cord is included, permitting mobile operation from automotive power or from an auxiliary pack to extend operating time. Has a carrying handle and fits inside of an attache case \$495.00.

Circle HelpCard No. 121

BITS Power Systems, Inc.

11020 Audelia Road, Suite B114

Dallas, TX 75243

(214) 340-1208 (TX); (800) 527-1378

MicroSetter, a hardware interface and accompanying software, enables you to use your Apple II as a typesetting machine. You can enter text for typesetting by using almost any word-processing program or MicroSetter. You type English codes into the text to generate typesetting from word processing. By recording text on disk first, you can create proof copies on line printers, perform spelling checks and make corrections easily. MicroSetter allows you to see and control line endings and aindentations before text is sent to the typesetting machine. It can also perform automatic indentation. You can reformat text to a different line length with a single keystroke. The interface, including the MicroSetter software costs \$695.

Circle HelpCard No. 204

TeleTypesetting Company

224 Nickels Arcade

Ann Arbor, MI 48104

(313) 761-7664

Three and one-half times faster execution speeds on virtually all programs for the Apple II and II Plus computers can now be achieved using the new **Accelerator II subsystem** from Titan Technologies (formerly Saturn Systems). The unique card, based on a fast 6502 processor with 64K of high speed memory, allows the user to speed up programs like VisiCalc, DB Master, Pie Writer, Home Accountant, Multiplan, Screen Writer II, Apple Writer, Word Handler, even games like Frogger, Zork and Wizardry. The dramatic and authentic 3 1/2 times speed increase improves efficiency and productivity and reduces the frustration of long delays and wait times in both business and home applications. The Apple II main board handles only the video display while the Accelerator II duplicates the 48K of the Apple and adds a built-in, fast language card. Thus, virtually all Apple II computer software can have the benefit of greater speed. When desired, the Accelerator II will function at normal Apple II or II Plus speeds \$599.00.

Circle HelpCard No. 122

Titan Technologies, Inc.

310 W. Ann Street

Ann Arbor, MI 48104

(313) 662-8542

Employing a re-inking principle, this new ribbon cartridge is compatible with all members of the Anadex dot-matrix printer product line. The 1/2 inch wide, 30 yard long nylon ribbon is contained in a Moebius loop within the cartridge. An inked, sponge rubber roller transfers the ink to a hard plastic roller that, in turn, contacts the ribbon to supply additional ink as the ribbon is used. This dual transfer process ensures that the proper

PERSONAL

- IMPROVEMENT
- CONFIDENCE
- KNOWLEDGE
- ADVANCEMENT

LEARNIT

THE
C-O-M-P-U-T-E-R-I-Z-E-D
flashcard method of learning

- FACTS ● KNOWLEDGE ● ANSWERS
- that you want to learn

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- ♦ an ingenious **HINT** feature helps you recall & associate by giving only selected parts of a fact or answer whenever you ask for it
- ♦ cards can be used in reverse order, back side shown first, (excellent for english ↔ foreign language learning)
- ♦ cards can be sorted, changed, erased, added, stored & more
- ♦ **you select** either self or computer scoring
- ♦ missed cards can be selected out for rerun as often as you decide

will run on Apple II+ with 48k or Apple IIe

send \$26.95 (postage included) for disc & manual to **TELEMETRICS** p.o. box 606 Arab, AL 35016

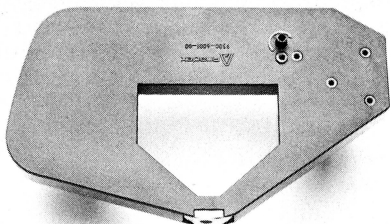
—Alabama residents add \$1.75 sales tax—

Circle HelpCard No. 55

amount of ink is added to the ribbon. The ribbon within the cartridge is moved by a gear mechanism that is operated from the printhead motor. Print quality obtained with the new re-inking ribbon cartridge is comparable to that of the older cartridge version. \$18 each in quantities of six.

Circle HelpCard No. 123

Anadex, Inc.
9825 De Soto Avenue
Chatsworth, CA 91311
(213) 998-8010

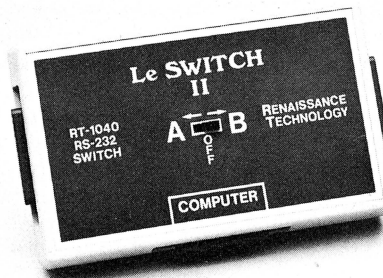


Two printers can be run from the same computer with Renaissance Technology's **Le Switch**. Available in both parallel and serial versions, Le Switch enables initial word-processing and editing to be done on a high-speed dot matrix printer, and then switched over to a letter-quality printer for the final document - all done with one easy hookup. Le Switch I (for parallel printers) consists of a female Centronics connector for input, and a male Centronics connector at each end of its two ribbon

cables for output. Le Switch II (for serial printers) features three female DB-25 connectors compatible with a wide number of RS-232C computers and printers. A modem can also be installed on one of its serial ports. Le Switch retails for \$155, Le Switch II for \$125.

Circle HelpCard No. 124

Renaissance Technology Corporation
1045 Detroit Avenue
Concord, CA 94518
(415) 676-5757



Calling Four is a game-port expander that eliminates the need for you to remove the cover on your Apple II computer every time you switch controllers. You can plug up to four devices - for instance a trackball, a joystick, a paddle and a mouse - into the Calling Four unit at one time. Plugs into any one of the Apple's expansion slots. You select an individual controller by entering a simple set of keystrokes or a software code. The peripheral features an LED display that indicates which of the four ports is in use \$69.95.

Circle HelpCard No. 125

Discwasher
1407 North Providence Road
P.O. Box 6021
Columbia, MO 65205

The **Wire Tree AC surge protector** has four outlets and provides power surge protection that conforms to IEEE guidelines. It comes with a bracket to mount underneath your desk or table and has a unique cable support feature which organizes your system's power cards into a neat bundle and moves them out of your way. Lets you control system power from a single illuminated on/off switch.

Circle HelpCard No. 126

Networkx
Brooklyn, NY 11237
(212) 821-7555

PC Saver protects your computer two ways. It filters current from the wall outlet by removing radio frequency interference (RFI), surges, spikes and transients before they get to your computer. It also will stop "feedback" noise from peripherals such as printers, etc. An "L" type filter attenuates common and transverse mode noise. Surges and spikes are clipped to a safe 133 volt RMS/189 volt DC level. Fits all Apple computers and others. \$39.95 at your local dealer.

Circle HelpCard No. 127

Kensington Microwave Ltd.
919 3rd Avenue
New York, NY 10022
(212) 486-7707

SOFTWARE

Business (General)

Print Master is a complete printing disk for Apple users. It prints business (or personal) checks, mailing lists, mailing labels and addresses envelopes, all from file data. It has powerful sorting features like the more expensive programs but is very easy to use. Gives professional looking results everytime. Check printing includes payee's name and address for use with window envelopes. Will print checks up to \$10,000.00 with all information on check stubs. Uses standard stub-type checks (sold at all banks) and prints standard pin-feed labels (sold at most office supply houses). The program, which is completely menu driven, will create name and address files, change files, re-arrange files, flip through entries, delete entries, etc. Up to 450 names can be in the memory at once for

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ATTENTION APPLE IIE USERS

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instant recall. No limit on how many files it will handle \$29.95. Requires 48K and an 80 column printer.

Circle HelpCard No. 128

Soft-Byte

P. O. Box 5701 Forest Park
Dayton, OH 45405

Microbase, a new database program for the Apple //e and /// computers is written in Word Processing Language (WPL). It is designed to enhance the capabilities of Apple Writer, the popular word processing package produced by Apple Computer Inc. Microbase operates inside of Apple Writer, and allows the user to create blank forms, standard documents, and data files. All files are standard text files which can be accessed by Apple Writer as well as external programs written in BASIC and Pascal. The information contained in the data files can be automatically integrated with either the blank form or document files for printing. Maximum file size is limited by the amount of memory available through Apple Writer, typically 64K. The number of records per file is also governed by the amount of available memory. Requires an 80 column card and ProDOS \$39.95.

Circle HelpCard No. 129

Phantom Software

P. O. Box 39

Sugar Run, PA 18846

(717) 746-1919

The new **dBASE II version 2.4** update features an on-disk tutorial. Divided into ten well-paced lessons, the tutorial acquaints users with the principles and theory of general database management while providing users with valuable hands-on experience. The tutorial's interactive format encourages users to progress at their own speed as it guides them from beginning exercises through advanced programming techniques. The new version also contains several user-convenient enhancements aimed at increasing the system's extensive automatic information management capabilities. One of these features is a **HELP** command that implements an on-line reference to dBASE II command syntax and usage. Also includes a new diagnostic error trace-back feature that allows users to debug their own programming efforts.

Circle HelpCard No. 130

Ashton-Tate

10150 W. Jefferson Blvd.

Culver City, CA 90230

(213) 204-5570

Friday!'s circular software construction is designed to facilitate the learning experience of a new computer user as well as accommodate the speed and performance required by the experienced user. Within minutes, the product's menu-driven format allows first-time users to enter and use information. This easy-to-use approach is well documented on screen and in the

companion manual. Retrieving large quantities of information is possible in seconds and sorting files on up to five different items at the same time is easily accomplished. Whether a user prints quick reports or prepares specialized professional documents, **Friday!** is designed to execute tasks quickly. In addition, the program automatically performs calculations on entered data and reports. It also contains a mail management utility which automatically creates label specifications and creates form letters. Compatible with dBASE II files, Lotus 1-2-3 and Word-Star.

Circle HelpCard No. 131

Ashton-Tate

10150 W. Jefferson Blvd.

Culver City, CA 90230

(213) 204-5570

Amphel's Simple Tenant Billing System is a menu driven billing system specifically designed for use by rental property owners and managers. The system can handle up to 500 accounts per diskette for apartments, mini-warehousing, offices buildings or warehouses. A complete instruction manual and screen prompts allow for a quick and easy understanding of the system and its operation on the Apple II or //e with either one or two disk drives and a printer. Rent for each unit is manually entered only once for each tenant and carried forward until changed. If the payment posting option is used any balance due at month end is automatically placed in this category. Manual input is optional. Late charges can be computer calculated either by percentage of past due, flat charge or manually input. Utility fee is computer calculated according to the square footage of each apartment and common area if applicable. Miscellaneous unusual charges are manually input. Payment, at your option, can be posted on account as received. A two line message is also available for printing 140 characters of information on each bill printed. Bills can be printed on blank paper or preprinted continuous forms for a professional look. Designed to be used with #10 window envelopes to eliminate mailing labels and additional addressing. Hard copy of complete tenant file for permanent record or quick reference is standard \$99.95.

Circle HelpCard No. 132

Amphel Industries, Inc.

2888 Bluff Street, Suite 353

Boulder, CO 80301

(303) 440-0411

Magic Memory is a directory data base system that can be operated by the first time computer user. Magic Memory's screen resembles an address book, with tabs designating lettered entries ("A", "B", etc.). This allows names, addresses and phone numbers to be stored, deleted and transferred in an instant. Magic

Memory provides 24 additional tables that can be designated in any manner that the individual chooses. Suggested headings include: anniversaries, birthdays, deadlines and customer lists. Each tab can store up to 255 entries. It also has the ability to print out a complete address book. Magic Memory is the ultimate organizer \$99.95.

Circle HelpCard No. 133

ARTSCI, Inc.

5547 Satsuma Avenue

North Hollywood, CA 91601

(213) 985-5763

With **SALVO**, unlock the total potential of your personal computer. Easy to use, easy to learn. Create applications in 1/10 the time compared to COBOL or BASIC. Reduce dBase II type work by 50% or more. This is a new natural fourth generation language that rivals sophisticated main-frame packages at a fraction of the cost. Report generator provides a flexible method of extracting data. Powerful language command set eclipses any third generation language. True relational DBMS links up to 16 files at once. Query Facility gives natural communications capability.

Circle HelpCard No. 134

Software Automation Inc.

14333 Proton Road

Dallas, TX 75234

(214) 392-2802

Communications

Upgraded versions of **Transend communications software** provide intelligent terminal communications, verified file transfer, and electronic mail. The upgraded version includes new features that further enable both novice and sophisticated users to take full advantage of the program's capabilities. New features include: Auto-Configuration - by simply entering your particular terminal and peripheral options, Transend will configure itself automatically. Automatic log-on capability logs the user onto the selected computer or information service automatically during each successive use. It can be programmed to dial up to eight different systems automatically or be linked to 22 keyboard macro functions. These functions provide, with a single keystroke, transmission of up to 836 characters of information. The user can enter a sequence of menu selections from anywhere within the Transend program and page ahead automatically through the menu screens to any other place within the program. Transend 1 \$89.00, Transend 2 \$149.00, Transend 3 \$275.00.

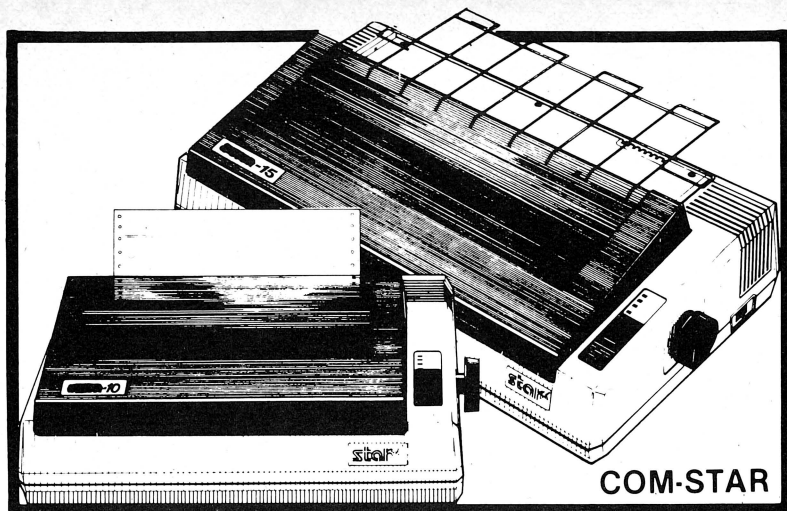
Circle HelpCard No. 135

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(408) 946-7400



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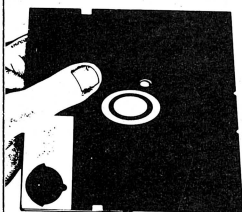
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Products below, when used appropriately, either singly or together, will enable you to copy virtually all software for the relevant computer. The copy-products are intended to be used for back-up purposes only! Products are Apple-compatible unless otherwise indicated.

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Circle HelpCard No. 10

Educational

The new **Intelligent Tutor series** is available for high school math subjects. It is designed to help students improve their comprehension and build confidence in all areas of high school math. The series is comprised of five titles: Algebra I, Geometry, Algebra II, Trigonometry and Advanced Topics, and SAT Math. Each package in the series will help students identify their areas of strengths and weakness, and will allow students to practice a wide variety of problems from all topics covered in the specific math subject. In the Diagnostic mode, each package presents the student with a test covering a range of subject areas. The program shows the student's performance and major areas of strength and weakness. In the Practice mode, the student can select and practice particular categories of math problems. The SAT Math package sells for \$69.95, and the other four packages in the series sell for \$49.95. If all five packages in the series are purchased, the retail price is \$199.95.

Circle HelpCard No. 136

Intelligent Software, Inc.

9609 Cypress

Munster, IN 46321

(219) 923-6166

Early Games Matchmaker is designed as a reading-readiness program for pre-schoolers. It playfully guides children through a series of six discrimination/matching games involving colors, shapes, sizes, lines and directions, facial expressions, and reversible letters. Youngsters make gross discrimination at the beginning of each game and are challenged with finer discriminations as the game progresses. Musical sounds combine with colorful graphics to help children understand why their responses are right or wrong. The games play easily and even two-year olds do not require adult supervision. Children develop computer expertise, have fun playing the matching games, and lay the groundwork for learning to read - all at the same time \$29.95.

Circle HelpCard No. 137

Counterpoint Software, Inc.

4005 West Sixty-Fifth Street

Minneapolis, MN 55435

(612) 926-7888 (MN); (800) 328-1223

Create-A-Test is a sophisticated test writing program. With it, teachers can select questions from question disks and print them out to produce perfectly formatted tests in as little as 10 minutes. It prints almost any kind of question including true-false, multiple choice, fill in the blanks, matching, and problem solving.

Answers can be printed with the questions. Teachers can buy questions or write their own with the built-in text editor. The Create-A-Test question library presently has 21 disks containing 450 questions each. Topics available include: chemistry (14), biology (2), physical science (2), physics (1), botany (1), and geography (1). Question disks require the Create-A-Test program which is \$89.95. Question disks are \$49.95 each. A package containing the program and four question disks sells for \$200.00. The 37 page manual includes step by step instructions that make it easy for anyone to use all of the features of the program. Requires any Apple II, one disk drive and a printer.

Circle HelpCard No. 138

Cross Educational Software

P. O. Box 1536

Ruston, LA 71270

(318) 255-8921

Computer Tutor Series Four breaks the computer literacy barrier for all current and potential Apple II and //e users. Four one-hour videocassette tapes permit any user to have the equivalent of a permanent instructor at their command at any time, as often as desired. Each tape is divided into convenient 15 minute segments and using the completely interactive format, an individual can achieve immediate hands-on computer experience without any prior preparation or experience. Using these tapes people will become more than an intelligent user of the Apple - they'll become its master without getting buried in technical manuals. The tapes are: 1) First Byte of the Apple, 2) BASIC Programming: Coding, Counting and Comparing, 3) Graphics: A picture is Worth 1,000 Words and 4) Problem Solving: Calculating, Formatting & Filing. \$135.00 for each one-hour tape.

Circle HelpCard No. 139

Computer Tutor Publishing Company

925 DeMun Avenue

St. Louis, MO 63105

(314) 725-1088

Edu-Cave is a new 2-diskette software package of fun and learning for home or school use. Entranced by the Ultimate Quest, you wend your way up a treacherous mountain path, and descend into the depths of multi-chambered Kurzen Cavern. Throughout your journey you'll encounter hazardous blitzers, spatzers, and the challenging queries posed by the Wizard of Lore. Edu-Cave provides multi-level challenges in arithmetic, geography, and spelling. Quiz Maker allows kids, parents, and teachers to custom-design learning experiences in history, languages, science, or any topic of choice. Game

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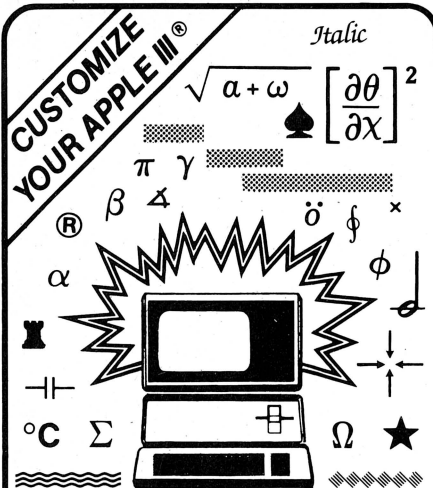
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difficulty can be selected from very easy to tough. Requires any Apple II with 48K and disk drive with DOS 3.3 \$29.50.

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Micro Program Designs

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Wilmington, DE 19808

(302) 738-3798

The **Participative Management Skills** package is a set of interactive tutorial lessons. It is designed to help improve employee-management communications and to reverse trends toward declining productivity in business and industry. The course has been used by managers and supervisors in both non-profit and profit-oriented organizations. An instructional text and all necessary computer software are included in the Duosoft PMS package. Specific subject matter covers the benefits of participative decision making; positive ways to use power within the corporate structure; how to facilitate team communication; understanding motivational dynamics; and achieving consensus.

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Duosoft Corporation

1803 Woodfield Drive

Savoy, IL 61874

(217) 356-3111



The **Scientific Method** tutorial introduces the student to the scientific method by presenting the following areas: define the problem, collect information, make hypothesis, check hypothesis, and reach conclusion. Finally, the student is given the opportunity to act as a scientist and put all the steps together as he solves an interesting problem, on his own. Throughout the program the importance of the use of control factors is emphasized. A series of interesting puzzles, mysteries, problems, and questions teaches the student to use a logical and common sense approach to solving a problem \$39.00. Designed for Junior high through high school. Requires any Apple II with 48K RAM and DOS 3.3.

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Cygnus Software

8002 E. Culver

Mesa, AZ 85207

Seven new **PLATO educational courses** include - The Computer Keyboard, Storage and Memory, Files and Editing, and Databases. These computer concepts courses are designed to provide students with the fundamentals of computer concepts as a springboard for building more advanced computer skills. Junior and senior high school students can expand their foreign language vocabulary with Plato's new French, German and Spanish "Create-A-Vocabulary" lessons. Each language course consists of 250 basic vocabulary words, including nouns, verbs and articles for nouns.

Circle HelpCard No. 143

Control Data Corporation

Minneapolis, MN

(612) 853-6605

Financial

SoftTax 1983 runs on any Apple II or /// computer. It performs both tax preparation and simulation functions. The entry routines use VisiCalc to speed and simplify data entry. All forms and schedules are printed for direct submittal to the IRS. New print features include: Batch print capability to allow a preparer to print returns for multiple clients with one request, a Proforma or Organizer that can be mailed to clients at end of year showing their prior year's figures, and a Print Parameter file to set options such as whether to round amounts to whole dollars or print dollars and cents, and preparer information for printing at the bottom of the signature forms. A one screen simulator shows current tax position based upon either detailed or summary entry. Can easily perform "What if?" analysis and assess the impact of various tax scenarios. The Individual Version \$199.00, Preparer's Version \$499.00, Professional Version \$850. Demonstration system available for \$25.00.

Circle HelpCard No. 144

Design Trends Ltd.

P. O. Box G

Wilton, CT 06897

(203) 834-1560

Tax Command, a Federal Income Tax calculation program, is now in its second year of publication. It provides a line by line method of calculating income tax for federal tax forms, including form 1040, income averaging, Schedule A - itemized deductions (including medical), capital gains and losses and contains all tax tables for every filing status. On computers with over 48K, Tax Command includes numerous other schedules as well. It does all mathematical calculations automatically, contains built-in tax tables

that calculate your tax refund or payment, and tells when to income average. While the program does not print on the actual form, in most versions it does print each entry needed on your tax form \$24.95.

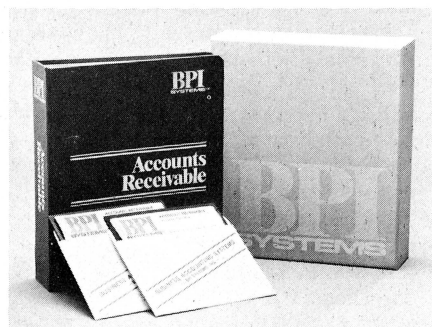
Circle HelpCard No. 145
Practical Programs, Inc.
P. O. Box 93104
Milwaukee, WI 53202
(414) 278-0829

CheckMinder is a personal finance program designed for both business & personal use. It allows 999 expense categories, handles multiple accounts and produces a multitude of reports; all done with extremely rapid data entry. Another plus: the entire program resides in RAM which eliminates module loading and speeds up use. The program runs on any Apple II or the ///. CheckMinder retails for \$69.95 plus \$3.00 postage.

Circle HelpCard No. 146
Sleeping Bear Software
1124 Fuhrman Road
Cincinnati, OH 45215
(513) 769-0692

BPI Accounts Receivable for the Apple //e enables a small business to take advantage of computerized accounting. The system offers you the important choice of either "balance forward" or "open item" accounting detailing. It details each item on the accounts receivable ledger with amount and dates. Automatically produces an Aged Accounts Receivable report for early account collection and business planning. Handles an unlimited number of customer accounts on multiple disks and permits you to customize your statements with your company name, address, payment terms, and other message or advertising. The system stands alone or interfaces with the BPI General Accounting system. Requires an Apple //e with 64K RAM, two Apple II diskette drives with DOS 3.3, a monitor, and an 80 column text card. It will also run on the Apple II Plus with an 80 column card and monitor \$395.00.

Circle HelpCard No. 147
BPI Systems
3423 Guadalupe
Austin, TX 78705
(512) 454-2801



OpVal is a new stock option analysis program that takes just 18 seconds to evaluate 96 options. The program's electronic book displays combine the ease of menu driven operation with the speed and flexibility of spreadsheet software. Features include forecasts of adjusted Black-Scholes prices for stock, index and commodity options, warrants and convertibles; recall of security information from disk; retrieval of market prices from Dow Jones or keyboard entry; auto-calendar; one keystroke printing; graphs of simple strategies and complicated positions; newspaper-like option displays. Manual/demo disk \$35.00. Complete program \$250.00.

Circle HelpCard No. 148
CalcShop Inc.
P. O. Box 1231
W. Caldwell, NJ 07007
(201) 228-9139

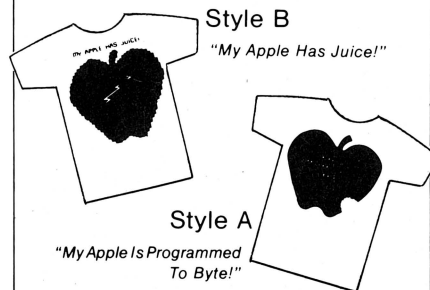
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Circle HelpCard No. 149
Suma Software Corporation
P. O. Box 2046
Beaverton, OR 97075
(503) 644-3212

Games/Simulations

Apple Cider Spider lives in the rafters of an apple cider factory, far from the noise and confusion of the bottling machines. To make his journey back to the safety of his web, he must avoid the perils of rolling apples, slicers, crushers, bottlers and capers - even the juice itself. As if all this is not enough to look out for, the spider must also contend with hungry birds and frogs who are out looking for a tasty treat. The faster he makes the journey through the factory, the more bonus points he is awarded. Detailed color graphics and sound

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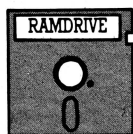
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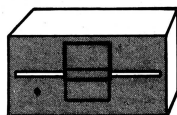
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PRECISION SOFTWARE
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Milwaukee, Wisconsin 53224
(414) 353-1666

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Circle HelpCard No. 42

effects add loads of fun and excitement for all ages. It can be played on the keyboard or with a joystick, by one or two players, and has Mockingboard compatibility. Available on disk for any Apple II for \$29.95.

Circle HelpCard No. 150
Sierra On-Line, Inc.
36575 Mudge Ranch Road
Coarsegold, CA 93614
(209) 683-6858

The circus comes to the home computer screen with **Sammy Lightfoot**, a new action game. Using paddles, joystick or keyboard, players maneuver Sammy, a budding circus acrobat, across different screens full of trampolines and swinging trapeze ropes, while rolling barrels, pounding hammers, grinning pumpkins, disappearing floors and tongues of fire try to stop him. Sammy's timing must be perfect to make it through to the magic carpet ride which awaits him; any false steps along the way and Sammy flips his orange wig! As Sammy successfully completes each stage of his daring journey, he jitterbugs with joy to well-known fifties tunes. Sammy Lightfoot is designed for all age groups and has a programmable menu allowing the player to choose whether he will play alone or with another, the level of difficulty of the game (levels are rated from 1 to 6) and whether it will be played with a keyboard, paddles or joystick. Available for any Apple II for \$29.95.

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Sierra On-Line, Inc.
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Quizagon is the computer quiz game to challenge all quiz games. Knowledge, strategy, luck - all are part of mastering Quizagon. Do you know the answers? Can you maneuver through the hexagons? What will the Quizards demand of you? Over 6,000 questions explore and expand the limits of what you know. Categories include science and geography, sports and games, entertainment and arts, history, words and potpourri. It's a family game, a party game, an exciting educational game for people who love to challenge their minds. Look for additional categories such as politics, literature, comics, old movies, and rock 'n' roll. There will also be curriculum based categories to help your children in school \$39.95.

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Counterpoint Software, Inc.

Early Games Piece of Cake is designed to teach the basics of elementary math. These five games lead children into a magical bakery where they learn to add, subtract, multiply and divide. Children keep count of the tasty cakes as they come out of the oven and are sold to customers. In Catch-a-Cake they learn to compute

quickly, before the cakes fall splat on the floor. When a child runs into trouble, the bakers explain what to do. This program adds a real element of fun to learning math, demonstrating that it can truly be a "Piece of Cake" \$29.95.

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Counterpoint Software, Inc.

Early Games Fraction Factory teaches elementary-junior high fraction concepts. At the Fraction Factory children discover they can see and describe fractions easily, find equal values with different denominators, multiply whole numbers by a fraction, add fractions to fractions, and subtract fractions from fractions. Colorful graphics and musical sounds help children understand what the numbers mean. Wrong answers are responded to up to three times with increasing degrees of sound, color and animation hints. This process helps children master the fraction concepts and puts them on the leading edge in their math understanding \$29.95.

Circle HelpCard No. 154
Counterpoint Software, Inc.
4005 West Sixty-Fifth Street
Minneapolis, MN 55435
(612) 926-7888 (MN); (800) 328-1223

Funtastic, Inc. announces the release of **Snack Attack & Friends** for any Apple II or /// computer. This package consists of the three best selling arcade games Snack Attack, County Fair, and Space Cadette, all on one diskette at a list price of just \$29.95. Proven popularity and appeal to all ages.

Circle HelpCard No. 155
Funtastic, Inc.
5-12 Wilde Avenue
Drexel Hill, PA 19026
(215) 622-5716

Cubit is a game that plays somewhat along the lines of a highly popular arcade game called Q*Bert by Gottlieb. Its unique three-dimensional movement brings new excitement to Apple series computing. It is a fun and challenging game for people of all ages. Cubit uses a three dimensional pyramid made up of cubes as the playing field. The object of the game is to change the color of all the cubes on the screen by jumping on them. It's you and Cubit against a pyramid full of bouncing balls, disguised snakes, and vicious gremlins bent on keeping you from completing your task. At your disposal, however, you have a set of transport disks and a magic star on your side to help you in your mission. Each level becomes progressively harder with different strategy and speed. Playable with both joystick and keyboard on a 48K Apple computer with DOS 3.3 or any compatible system \$39.95.

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Vulcan Software
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Birmingham, AL 35209
(205) 871-5510

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Broderbund Software

DROL offers Apple gamers plenty to cope with - from airborne turkeys that cook up into Thanksgiving roasts when you zap them, to overweight, hopping monsters that relentlessly toss lightning bolts, to scorpions, lizards, a magnet-tossing witchdoctor, and more. Games players take on the task of pursuing a red-headed girl and her propeller-beanied brother who have wandered away from their mother. Mesmerized by the spell of a witch doctor, the children drift aimlessly through the scrolling underground corridors of an ancient civilization. A rocket backpack, protective laser gun, and wide-screen radar scope will prove indispensable as you frantically try to come to their rescue and reunite them with their mother. Cheerful, funny and unusually rich in detail and color. The outstanding graphics also feature amazingly detailed animation \$34.95.

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Broderbund Software
17 Paul Drive
San Rafael, CA 94901
(415) 479-1170

EAGLES is the game that flies you over France during World War I to join the men

who first rose to the skies like the glorious birds of prey the game is named for. This realistic strategy simulation gives you fourteen historic lanes - including the feared Fokker DR-1 Triplane (the Red Baron's favorite) and the legendary Sopwith Camel - each accurately rated for speed, rate of climb, and maneuverability. If you like, you can even fly planes of your own design. You can play against enemy planes flown by the computer, or against other players. Fly balloon-busting missions, set up duels between single aircraft, or create grand dogfights involving as many as twenty planes. Choose historic scenarios, or let the computer set up the battles.

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Strategic Simulations, Inc.
883 Stierlin Road, Bldg. A-200
Mountain View, CA 94043-1983
(415) 964-1353

Seven new software programs for children and their families have been announced for the Apple II computer. **Stickybear Basketbounce** is a multi-level computer game for the entire family, with special play value for young children. Players win points by catching colorful bouncing bricks, doughnuts or stars before running out of baskets \$39.95. **Stickybear Opposites** is a game that teaches opposites - up/down, full/empty, in front/behind, and more to 3 to 6 year olds. Includes disk, hardcover 32-page "Yes and No" book, user's guide, poster, stickers and vinyl binder \$39.95. **Stickybear Shapes** helps 3 to 6 year olds learn to recognize shapes of common objects. When the child makes a correct choice, the big, bright picture comes alive with animation. Disk, 32-page Shapes book, user's guide, poster, stickers and vinyl binder \$39.95. **Fat City** is a family game that has the player operating a wrecker to flatten buildings while trying to escape garbage cans hurled by irate tenants \$39.95. **Chivalry** - unique union of boardgame and software features 20 different games based on the days of chivalry - jousting, tournaments, etc. Disk, gameboard, playing pieces, poster, instructions, strategy hints, and storage case \$49.95. **Exploring Tables & Graphs**, Grades 3 to 4 is an introduction to the way graphs work and how they are used. Games focus on topics such as endangered species, world languages and populations \$34.95. This is also available for Grades 5 to 6 in which students experiment with tables and pictures, bar, line and area graphs. Topics for games range from trees to satellites \$34.95.

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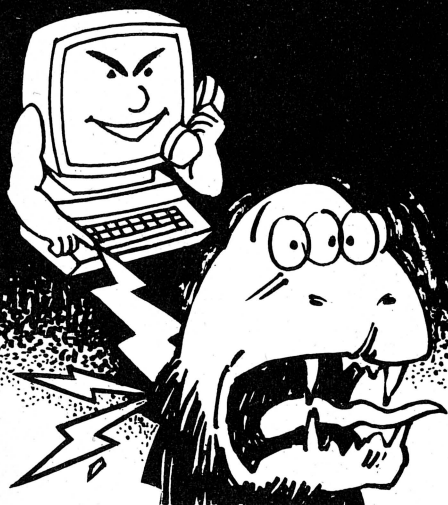
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Fortress is a classic strategy game of power and conquest. It is beautifully simple in concept: occupy a place, fortify it, and dominate the surrounding countryside. Lay siege to your opponent's fortresses, or better still, outflank them. The rules are few: the possible moves, virtually limitless. Even though this game allows two human players to match wits against each other, the solitaire game is far more provocative. Five different computer opponents are provided, all given colorful names to match their unique style of play: Genghis Khan, Count Vauban, Lord Maginot, Sir Galahad, and the Squire. Computer opponents are programmed not only to play but to learn and improve. Each time they play you, they study your strategy and memorize your strengths and weaknesses. The better you get, the better they'll play, using your own habits and tricks against you. Simple, fast (each game lasts less than 10 minutes), and ever more challenging, Fortress is available for any Apple II with 48K \$34.95.

Circle HelpCard No. 162
Strategic Simulations, Inc.

Professional Tour Golf is a game that brings together the greatest golfers on some of the most formidable holes in the world. Gives you a choice between two different championship courses: the famed seaside course at Pebble Beach, or a course which was created from the most famous and difficult holes on courses around the world, such as the Augusta National, Merion and Oakmont. Twenty of the best players have been realistically recreated, each rated according to his power, accuracy and skill. You can play against these famous pros, play alone, or against your skillful friends. You'll choose your club, angle and amount of spin for each drive, and carefully measure your putts. Wind, trees, traps and water are all factors in determining the strategy of your play \$39.95.

Circle HelpCard No. 163
Strategic Simulations, Inc.
883 Stierlin Road, Bldg. A-200
Mountain View, CA 94043-1983
(415) 964-1353

Graphics

Plotpro is a set of three Microsoft BASIC programs which make scientific graphs on any 80 or 132 column printer. Plotpro creates linear, semi-logarithmic, and full logarithmic plots and will plot multiple functions on the same graph. Forced scaling and auto-scaling are supported as well as optional grid lines to aid in graph interpretation. The Protemp module creates templates of the physical appearance of any graph. These templates specify the type of scaling (linear, log, forced, or auto-scaled), axis labeling, ranges for each axis

and other information. The Proquick module controls plotting and printing of infinite length graphs limited only by paper length. Generates vertical formats suitable for use in reports, viewgraphs, etc. Data files are easily generated by BASIC, Fortran, Cobol, or Assembly language programs. A 20 page manual and sample files are included \$49.95. Runs on the Apple II Plus CP/M or any 8 inch or 5.25 inch CP/M based system.

Circle HelpCard No. 164
BV Engineering
P. O. Box 3351
Riverside, CA 92519
(714) 781-0252

CustomFONT will enhance Apple /// word processing, spreadsheets, and user programs with custom characters, symbols and fonts. Business logos, complex mathematical formulae, foreign language characters, and block graphics are only a few of the possible applications. Apple /// developers can create distinctive displays and reports for new applications programs and games. Includes built-in file utilities and a file of ready-to-use symbols for technical writing, screen and report formatting, and games. Character design and font-file customization is accomplished via a sophisticated interactive graphic interface. ASCII tables and keyboard guides can be printed as an aid to using customized character sets. Special features for developers include commands to create flashing characters and listing of routines to download character sets at run time. CustomFONT is easily transferred to the Profile or other hard disk. On-line help screens and complete documentation ensure ease of use in any application. Requires 256K of memory. Custom printing of special characters and fonts requires one of the following graphics printers: Epson MX, FX, or RX, Pro-writer, IDS 460, 560 or Prism, or Apple DMP. CustomFONT is available for \$149.00.

Circle HelpCard No. 165
Swenson Associates, Inc.
45 Newbury Street
Boston, MA 02116
(617) 267-3632



Color Me is a computer coloring book with 25 Hi-Resolution pictures. The pictures are designed with various degrees of difficulty and include familiar objects and animals. Each picture is titled in large capital letters for word and subject recognition. Use paddles or joystick to select from 32 color pots and 4 choice boxes at bottom of screen. Designed for 3 - 12 year olds, Color Me introduces the child to the exciting world of computer colors, textures and graphic combinations. This coloring book can be used over and over again providing a new creative medium for challenge, fun and excitement \$29.95. For the Apple II-//e.

Circle HelpCard No. 166

Versa Computing, Inc.

3541 Old Conejo Road, Suite 104

Newbury Park, CA 91320

(805) 498-1956

Doublestuff uses standard Applesoft BASIC commands, in combination with your existing programs and your Apple //e. You can expand your color graphics from 16 color Lo-Res (40 x 48) to double Lo-Res (80 x 48). Unheard of before - available now with BASIC commands. Double Hi-Res 16 colors (560 x 192 pixels) is all yours on the Apple //e. It literally doubles the width on your standard color TV monitor. Requires either an 80 column card for double Lo-Res or Extended 80 column card for double Hi-Res and Lo-Res.

Circle HelpCard No. 167

Software Development Inc.

2053 West 11th Street

Brooklyn, NY 11223

(212) 449-6300

Languages (Programming)

Robot Control Language (RCL) is a complete software development system to program the RB5X personal robot using common English words and phrases. Based on Excalibur's personal language system called Savvy, RCL acts as a sort of foreign language interpreter between the robot and its owner. RB5X's on-board microprocessor, the INS 8073, is programmable in Tiny BASIC, using most brands of computers. Users write programs on their computers and then transfer that information to the robot. While it is easier to learn and use than most other high-level languages, Tiny BASIC still demands precision and accuracy, as well as the memorization of complex codes and symbols. By contrast, RCL allows RB5X owners to create applications software using English words, which are then transformed by the system into the Tiny BASIC code the robot needs to perform its various tasks. RCL I is for use on one-disk drive systems and costs \$395.00. RCL II works on systems with more than one disk drive or with

a hard disk system \$545.00. Users who have previously purchased SAVVY may buy an RCL upgrade for \$125.00.

Circle HelpCard No. 168

RB Robot Corporation

18301 West 10th Avenue, Suite 310

Golden, CO 80401

(303) 279-5525

Two new versions of **SAVVY**, a natural programming language for Apple //e and II Plus, are available. The new versions offer Apple users a high-level programming language integrated with the SAVVY operating system and database management system. Business SAVVY introduced last year, adds to these capabilities a full complement of business accounting and applications-building tools for \$950. SAVVY One, a starter system, is designed for a single disk and consists of the programming language, a

database management system, a text editor and a co-processor printed circuit card containing a Z80A processor \$349.00. SAVVY Pro, for multiple and hard disk systems, expands the range of capabilities for which it is suited. Includes an automated database builder, as well as the programming language, data base management system and co-processor. In all configurations, it can run under the CP/M operating system and most standard 44K CP/M based application programs. Supports the Corvus hard disk, 80-column and uppercase/lowercase display, plus serial printers, parallel printers and additional diskettes.

Circle HelpCard No. 169

Excalibur Technologies Corporation

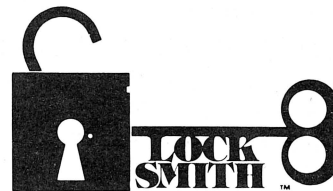
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Omega MicroWare

222 S. Riverside Plaza

Chicago, IL 60606

(312) 648-4844

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Music

Mini-Songwriter is a program designed to let anyone compose and play melodies on a "piano keyboard." It is easy to use whether or not the user is musically inclined. Mini-Songwriter appears on the screen as a graphic representation of a piano keyboard. The user creates a tune by pressing the computer's arrow keys to move up and down the musical scale. When a note is chosen, its length can be determined by pressing a number key. The note is then sounded by pressing the space bar. When the user plays a note, the letter of the note appears on the screen, thus helping the beginner learn note names. Your tune can be edited and then played back. You can also save your melodies to be played later. Mini-Songwriter is just one of the new programs included on this issue of Window, the educational magazine on a disk. Window Vol. 1, No. 3 is available for \$29.95. Subscriptions (five issues) are available for \$120.00 beginning with any issue.

Circle HelpCard No. 170

Window, Inc.

469 Pleasant Street
Watertown, MA 02172
(617) 923-9147

Dolphin Dialogue is a unique software program which creates and produces dolphin-like sounds. Now, musical pros and novices alike can experiment with the unusual sounds and sound effects created by Dolphin Dialogue. The program was the development software for a human-dolphin communications project now underway at the Institute for Delphinid Research in Grassy Keys, Florida. Syntauri is offering Dolphin Dialogue to help fund the research and let all sound enthusiasts benefit from the Institute's pioneering work in talking with dolphins. All you need for Dolphin Dialogue is an Apple II or //e computer and the Music-System (from Mountain Computer) to make the distinctive whistles and trills associated with dolphins. You can invent and save your own sounds. To hear the sounds, you simply play the Apple II keyboard: a sequence of letters will trigger a sequence of dolphin-like sounds \$39.95. A poster is also available for \$10.00. All profits go the Cetuman Foundation which funds the Institute for Delphinid Research in their human-dolphin communications project.

Circle HelpCard No. 171

Syntauri Corporation
4962 El Camino Real
Los Altos, CA 94022
(415) 966-1273

Genius Musician Board comes in a complete self-contained package with everything you need to hear and play computer generated music. Along with the card is included detailed instructions, keyboard coding labels, and two mini stereo speak-

ers with audio cables. With an easy-to-obtain adapter, you can also hook up a stereo amplifier with external speakers. Create, play and store music. Simply insert into Slot 2 on any Apple II computer. Add special sound effects (gunshot, explosion, laser or rockets firing, etc.) or designate melody, tempo, chord, beat and rhythm. One floppy disk may contain about one hundred popular songs with chord & rhythm.

Circle HelpCard No. 172

Innova Computer Industry Co., Ltd.
c/o Sundelight International Inc.
933-C S. Greenwood Avenue
P.O. Box 923
Montebello, CA 9040
(213) 728-5023

The Midi Network consists of an interface card which receives and transmits data between the computer and synthesizers, and generates drum timing information. It works like a multi-track tape recorder, with individual track function select and real-time tempo control. The user performs music on one of the connected synthesizers, and all data transmitted concerning the performance is stored as a "track" in the Apple memory. Also provided is an "edit" mode, which enables the user to "punch in", "punch out" and edit a recorded track. This information can either be merged with the old data (overdub) or it can replace the old data (splice). Requires any Apple II with 48 or 64K RAM, one disk drive and video monitor and works with one or more MIDI equipped synthesizers (Yamaha, Roland, Korg, Sequential, etc. and most popular drum machines).

Circle HelpCard No. 200

Passport Designs, Inc.
116 N. Cabrillo Hwy
Half Moon Bay, CA 94019
(415) 726-0280

Personal

DEC's famous **fortune cookie program** is now available for Apple owners. Your daily fortune is randomly selected from a data base of over 500 fortunes. The fortunes can be included in any user program. In addition to the random fortune selection program an interactive data base tool is included for addition, replacement, modification or deletion of fortunes from the data base. The number of fortunes is limited only by the user's imagination and disk size \$24.95.

Circle HelpCard No. 173

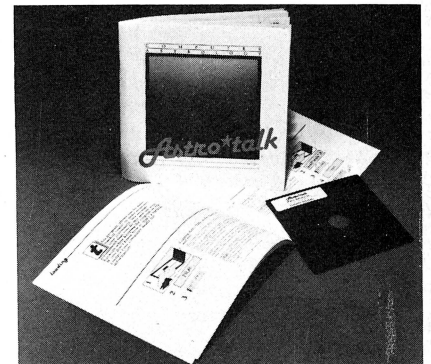
MSMS Software
1269 Albion Land
Sunnyvale, CA 94087
(408) 732-8354

With **Astro-Talk**, creating an accurate personal horoscope is only the beginning. This program "takes you through" that horoscope, showing you just what your

stars are saying to you. Through the insight of professional counseling astrologers, Astro-Talk looks at the unique qualities of your individual horoscope - the same horoscope astrologers use in their personal interviews or "readings." Based on individual birth information, you get an in-depth look at yourself or your family and friends through the age-old language of the stars. The menu format asks about your areas of interest: your career, your love life, etc. Use the "Student Astro-guide" feature to ask: "What does an Aquarius 'rising sign' mean" or find out what it means "when the Moon is in the 7th house." Contains an introduction to the concepts involved. Experienced astrologers can count on the program's accuracy. \$39.95 with a handsome illustrated user's guide.

Circle HelpCard No. 174

Matrix Software
315 Marion Avenue
Big Rapids, MI 49307
(616) 796-2483

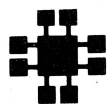


Astrocalc is astronomical software for the amateur, the professional and the teacher of astronomy or anyone interested in the sky and its observation (including astrologers). Date, time and locations are input and Astrocalc calculates and displays all basic data for the sun, moon and all planets. Output includes: rising and setting times plus brightness magnitudes; right ascension and declination, altitude and azimuth; ecliptic latitude and longitude, elongation from Sun; angular size, phase, orbital elements; inclination, eccentricity, ascending node; mean and true anomalies, distances; local sidereal time, Greenwich Mean and sidereal time; beginning and ending of twilight; Julian day number, solar equation of time. Comes with a complete manual explaining its use, with example output and an introduction to the fundamentals of positional astronomy. References are also included for those wishing to further explore the topic \$29.95.

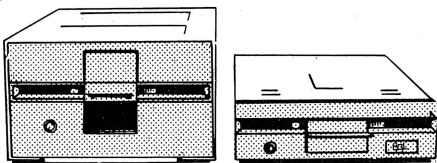
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Zephyr Services
306 S. Homewood Avenue
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(412) 1247-5915

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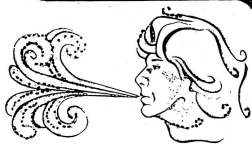
- ★ Use To Power Apple-Type Systems

- ★ +5V @ 5A +12V @ 3A

- ★ -5V @ .5A -12V @ .5A

- ★ Instructions Included

\$79⁹⁵



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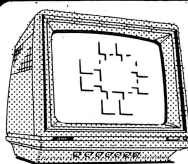
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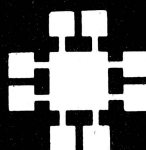
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Company _____

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City _____ State _____ Zip _____

Please check one box in each category:

1. This copy of Apple Orchard came to me through

- A. ☐ User Group
B. ☐ Computer Store
C. ☐ News Stand
D. ☐ Borrowed
E. ☐ Subscription
F. ☐ Book Store
G. ☐ School

2. I personally use most:

- A. ☐ Apple II/II Plus
B. ☐ Apple ///
C. ☐ Apple Workalike
D. ☐ Apple //e
E. ☐ Lisa
F. ☐ IBM PC or workalike
G. ☐ Don't own yet
H. ☐ Other

3. I have owned a microcomputer since

- A. ☐ before 1977 F. ☐ 1977
B. ☐ 1978 G. ☐ 1979
C. ☐ 1980 H. ☐ 1981
D. ☐ 1982 I. ☐ 1983
E. ☐ not yet

4. I use my computer primarily for

- A. ☐ Home
B. ☐ My Business
C. ☐ Hobby
D. ☐ Education
E. ☐ Other

5. I use my computer primarily with

- A. ☐ Word Processor
B. ☐ Business Software
C. ☐ Modem
D. ☐ Graphics
E. ☐ Electronic Spreadsheet
F. ☐ Data Base
G. ☐ Games
H. ☐ Control of other Devices

6. I spent on software in the past 12 months:

- A. ☐ less than \$100
B. ☐ \$100 - \$300
C. ☐ \$300 - \$600
D. ☐ \$600 - \$1,000
E. ☐ More than \$1,000

7. Regarding User Groups:

- A. ☐ I belong to a local group
B. ☐ I'm active in a User Group
C. ☐ I have never belonged to a local group
D. ☐ I used to belong to a local group, but don't now

8. My vote for the best article in this issue is

.....

9. My vote for the best ad in this issue is (Reader Service) number.....

Check each advertisement for corresponding number and circle below:

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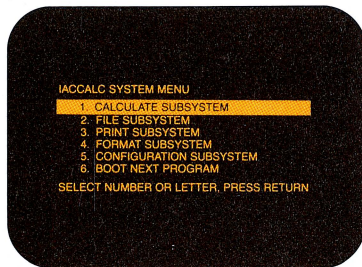
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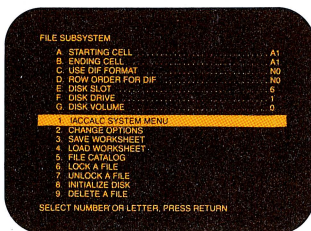
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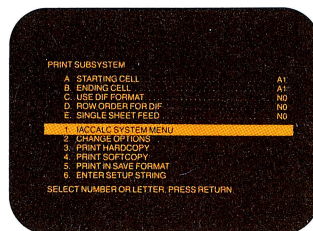
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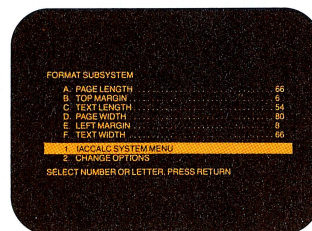
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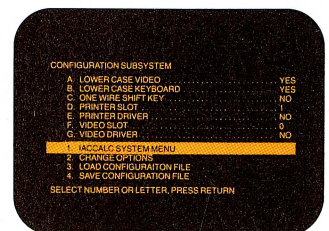
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ers. Even the Apple //e. It supports multiple RAM cards in any combination up to 512K. And has a 70-column video display with upper and lower case (when not using an 80-column board). This is only an option with other programs.

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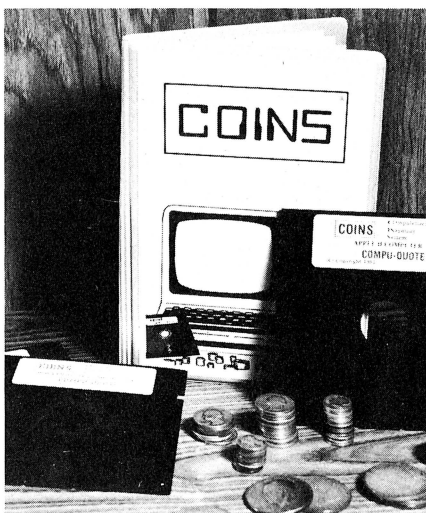
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The **Pascal Utility Pack** is a collection of utilities designed to make user-friendly programming less tedious. Most of the utilities are in Pascal UNITS, making them easy to include in any program. Such features as inverse and flashing text, low-resolution graphics, access to the disk directory, and bullet-proof input routines are provided by the Pascal Utility Pack. In addition, Filer functions such as disk K)runch and file T)ransfer become available to use inside your own programs. Complete source code is provided on the disk so you can see how the routines work and try your hand at modifying them.

Documentation and demo programs are also provided. Requires the Apple Pascal Language system \$24.95.

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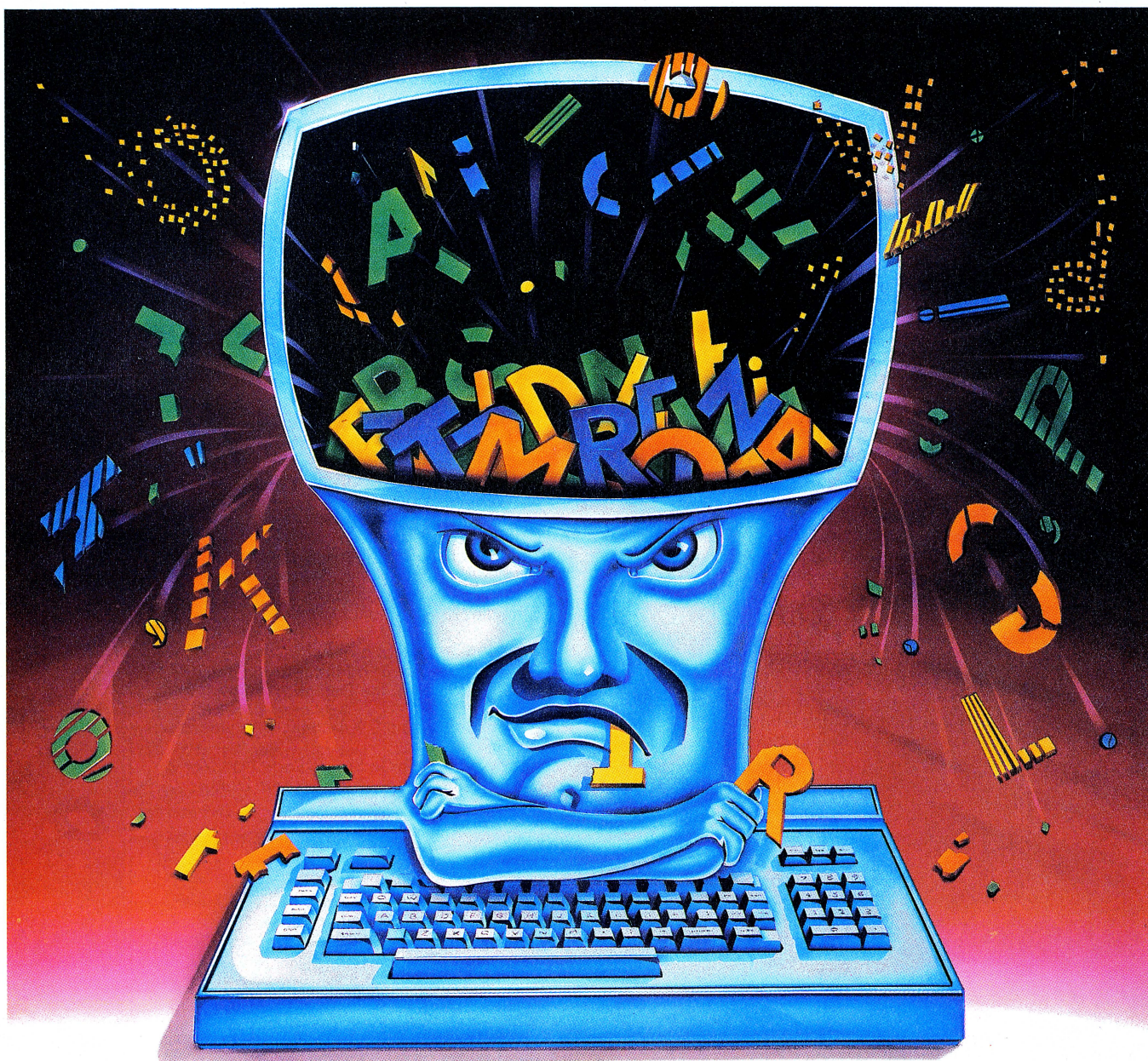
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Melbourne, FL 32901

(305) 7235717

The **Sensible Speller IV** is an improved version of the popular spelling verification program for Apple computer users. When used with Apple DOS word-processing files, the new Sensible Speller IV displays suspect words in context and allows immediate correction of any misspelled words. The program also features more extensive dictionary searching capabilities and automatic suggestion of correct spelling for misspelled words. Uses the official word list from the Concise Edition of the Random House Dictionary with over 80,000 real words on diskette. In addition to the improved version for use with Apple DOS word processors, each Sensible Speller package includes versions for use with Apple CP/M, Apple Pascal, and Silicon Valley's Word Handler word processors. Available for \$125.00 at your local dealer. Direct orders should include \$1.25

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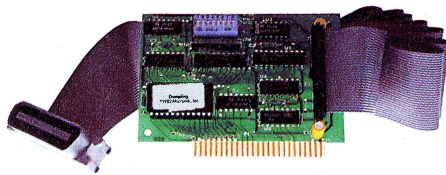
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- Printer bell Control.
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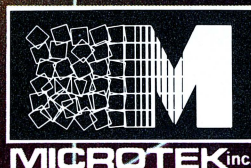
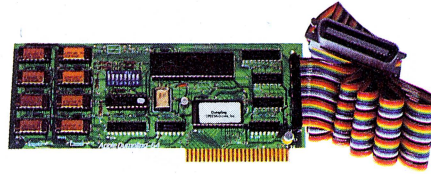
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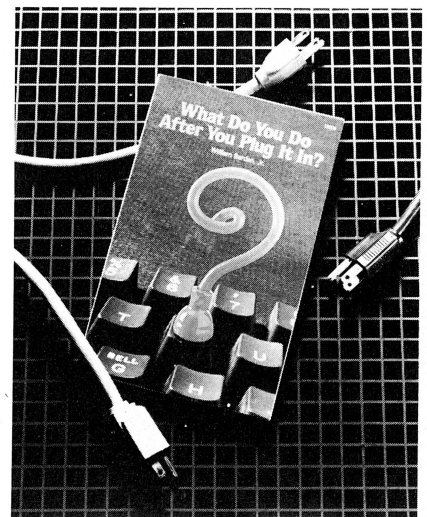
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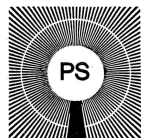
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The Software Catalog covers the spectrum of computer systems, operating systems, languages, and applications in two handy volumes - one for microcomputers and one for minicomputers. By publishing twice a year in the spring and fall, with updates in the winter and summer, it keeps pace with new software offerings. Recently given the "Gold Seal of Approval" by the Professional Software Programmers Association. Data used in compiling The Software Catalog are derived from the International Software Database (Fort Collins, CO). The database currently contains information on more than 31,000 software products, is updated continuously, and can be accessed online through DIALOG file 232. Microcomputer catalog (800 pages) \$69.00. Minicomputer catalog (560 pages) \$95.00.

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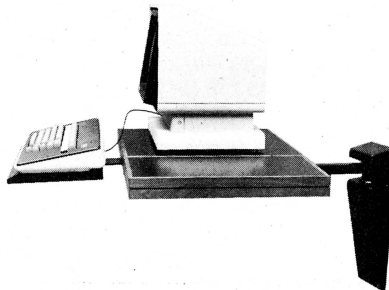
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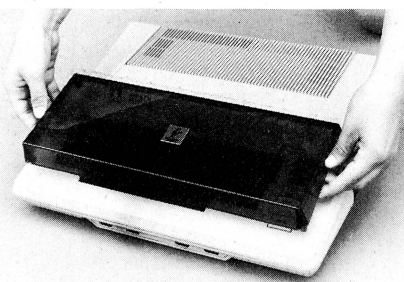
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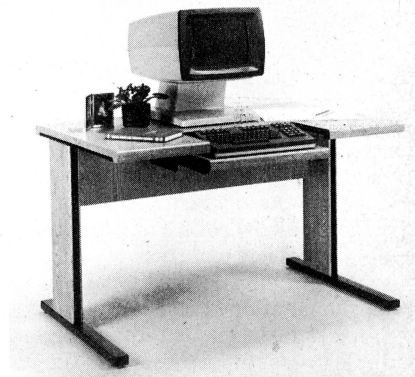
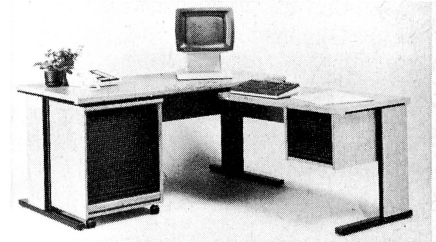


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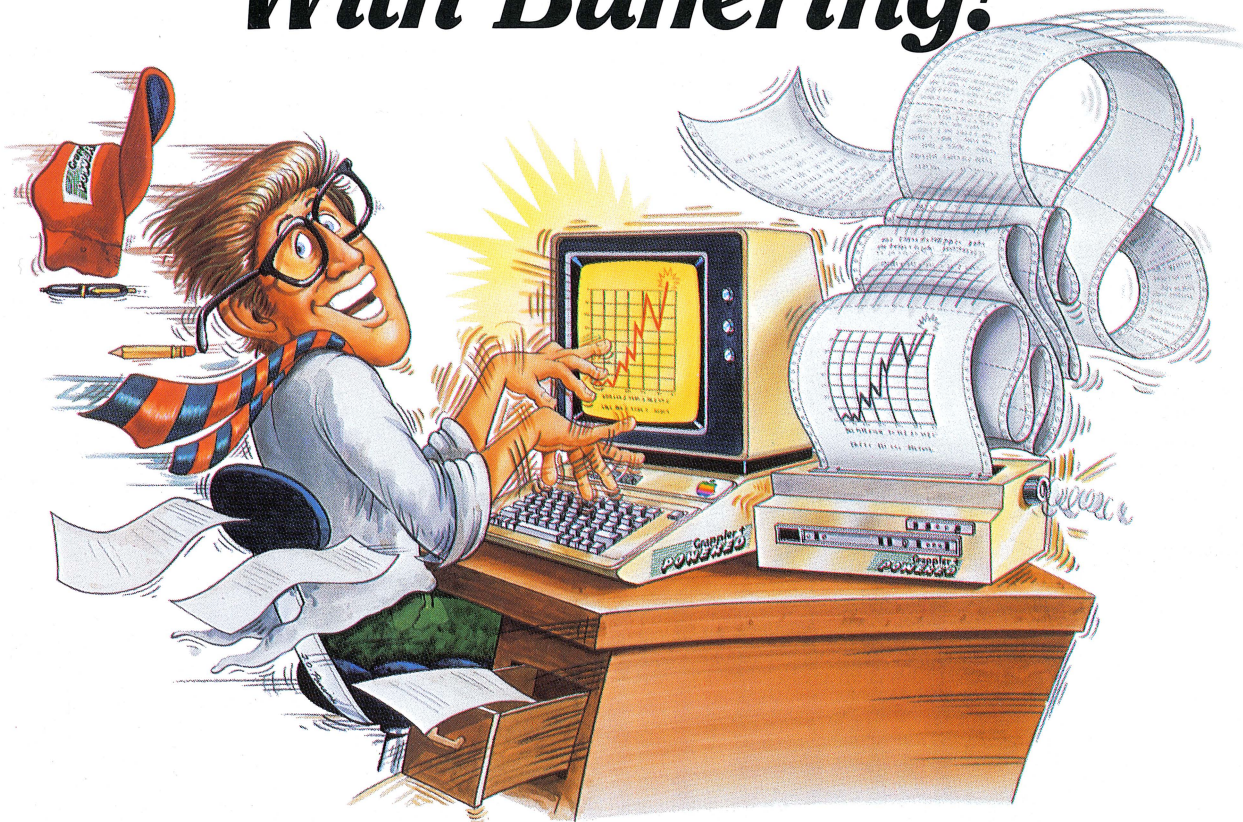
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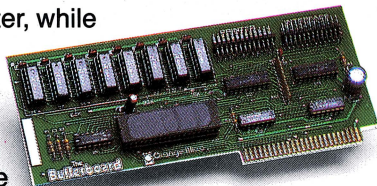
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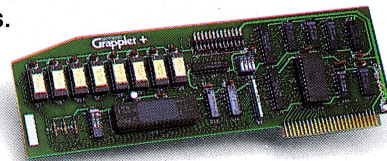
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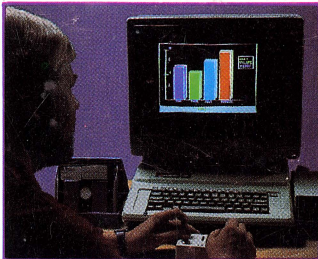
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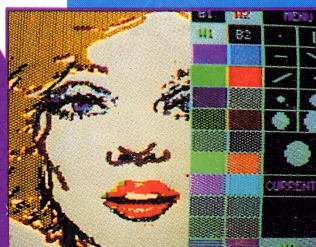
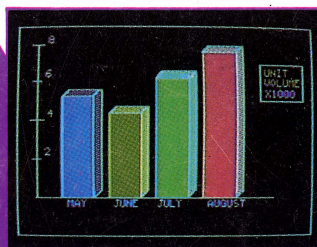
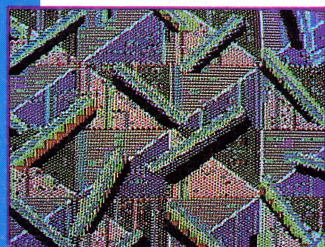
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